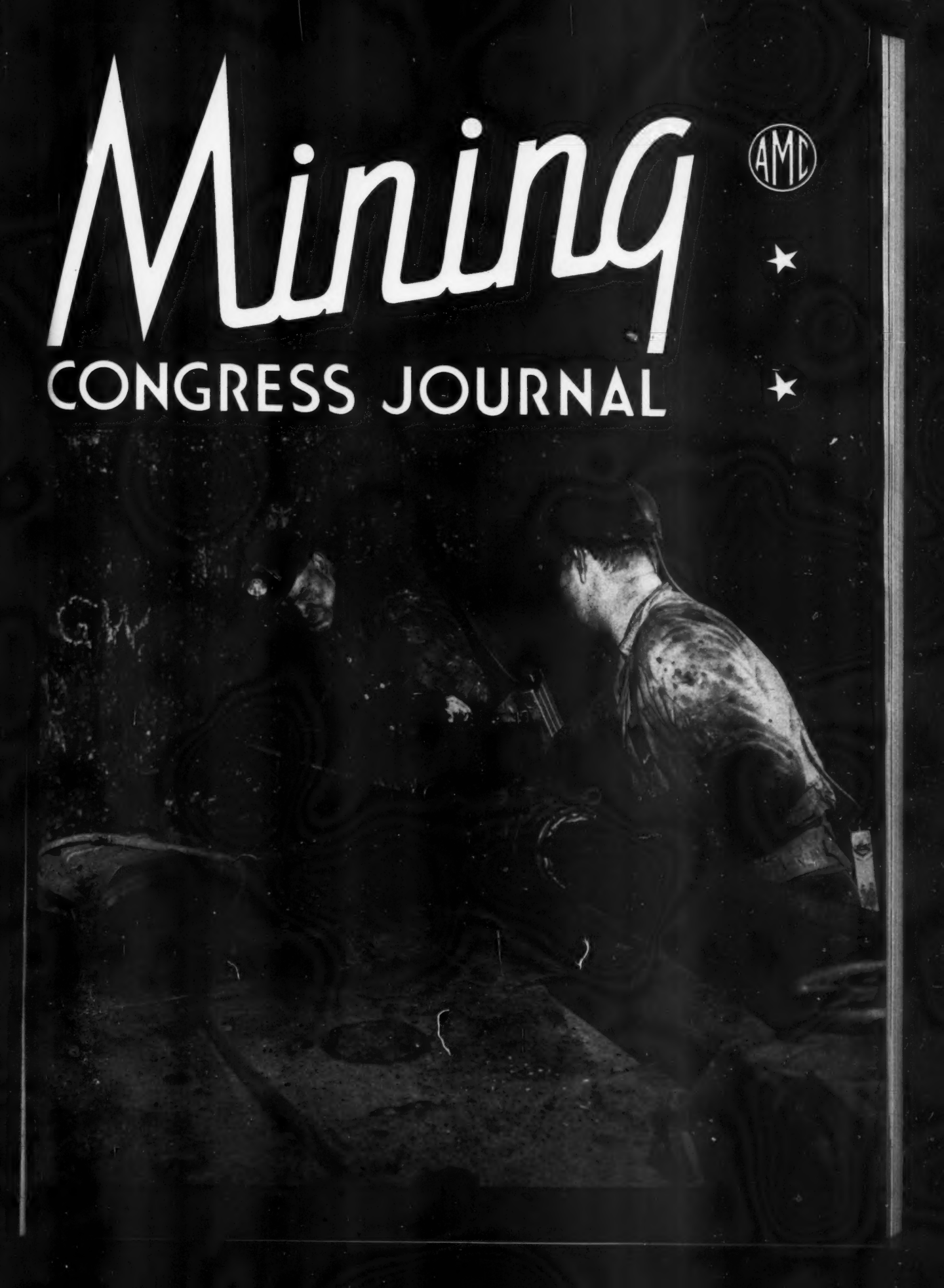
Mining

AMC

CONGRESS JOURNAL



862 ft. in ONE LIFT!

World's highest-lift single belt conveyor —engineered by LINK-BELT

When the H. C. Frick Coke Co. planned the mining industry's *widest* (72 in.) belt conveyor for their Robena Mine, Link-Belt designed and built it.

When the *longest* (10,900 ft.) belt conveyor was contemplated at National Mines, Link-Belt engineered and built it.

And, when Chicago, Wilmington & Franklin Coal Co. wanted the *highest-lift* belt conveyor ever built, they capitalized on this broad, diversified experience.

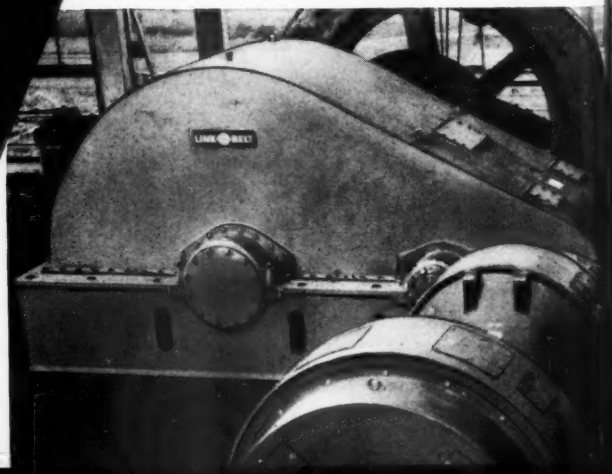
Today, at Orient Mine No. 3 near Waltonville, Ill., this Link-Belt 42 in. Belt Conveyor raises 1200 tons of coal per hour 862 ft. to the surface. There are no intermediate transfers . . . no intermittent hoisting by skip or cage. Just continuous, trouble-free, low cost movement on Link-Belt Roller Bearing Idlers.

In other phases of coal preparation, too, Link-Belt is out in front. For washing, drying, sizing, and car handling many of the nation's leading coal mines have found it pays to rely on Link-Belt. We think you'll find it pays, too.

12,578

At the bottom of the mine, Li
Belt 72 in. Apron Feeder
Live-Roll Grizzly provide
form, high-capacity feed.

Terminal machinery of the 3400 ft. long conveyor
cludes a 1500 hp L-B double-reduction Herringb
Gear Drive and rubber-lagged welded steel pulley.

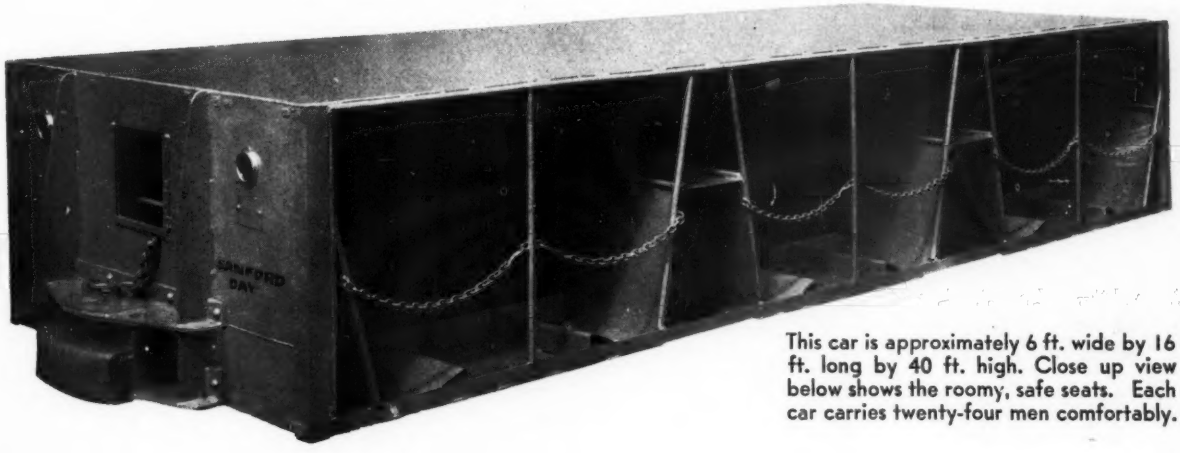


LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Salt Lake City 1, Seattle 4, Toronto 8, Springs (South Africa).

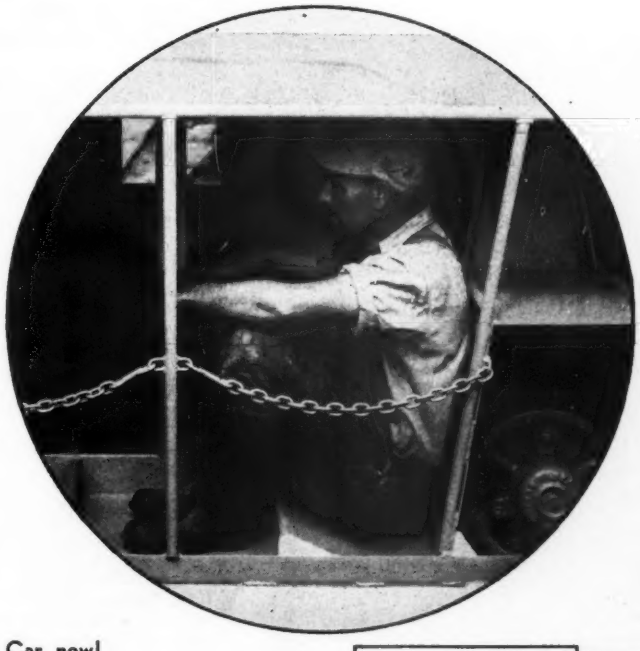
From the Wheels Up, An All-Steel Man Car For Maximum Strength And Safety At Low Cost!



This car is approximately 6 ft. wide by 16 ft. long by 40 ft. high. Close up view below shows the roomy, safe seats. Each car carries twenty-four men comfortably.

We engineered this man car into one compact, all-steel unit for safety, comfort and low cost! Note that individual seats are an integral part of frame work and designed for maximum comfort. Result: minimum production cost which means you pay less. Note further that Sanford-Day's Man Car has no costly streamlined construction. More savings passed along to you. Safety at low cost has been the important factor. Top of the car is completely covered with high grade insulation for trolley wire protection.

Nothing has been overlooked to make this Sanford-Day Man Car your best possible buy for safe and efficient personnel transportation!



Investigate this Sanford-Day Man Car now! For complete information, write to us today!

SANFORD-DAY IRON WORKS

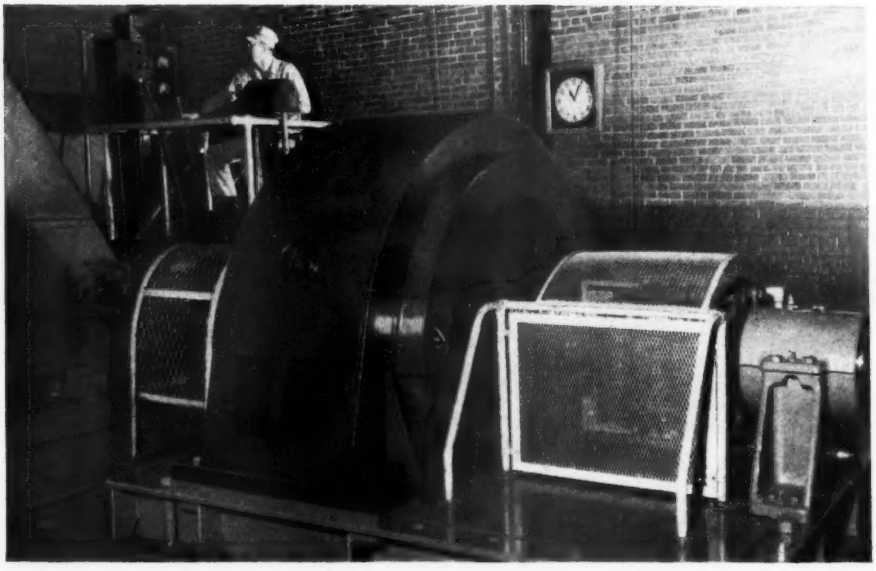
KNOXVILLE TENNESSEE

Devoting Our Entire Capacity to the Building of Better Mine Cars for Over— 50 YEARS

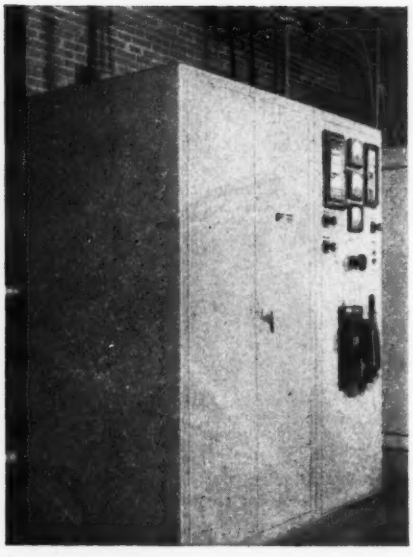
Mine output gets a lift with G-E hoist drives

265-foot shaft...

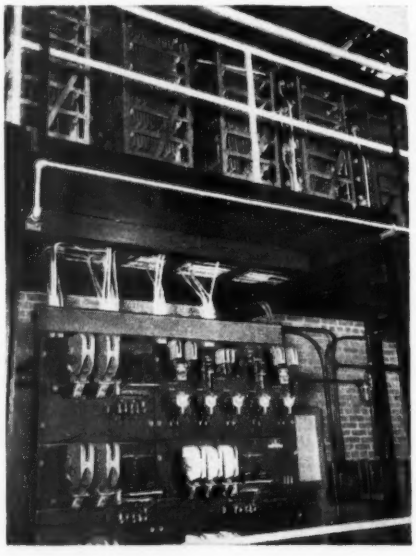
450 trips per day!



In this Pennsylvania coal mine the coal hoist averages 450 trips every 24 hours, working two eight-hour shifts a day. Its G-E a-c hoist drive helps maintain output because it provides high service continuity, needs only minimum maintenance. Shown here is the G-E 500-hp 2200-volt induction motor driving the hoist.



This G-E metal-enclosed primary control panel in the same mine incorporates the line circuit breaker, providing emergency disconnecting, and the primary reversing contactors. Completely wired and factory-assembled for quick, easy installation, this packaged unit includes everything needed.



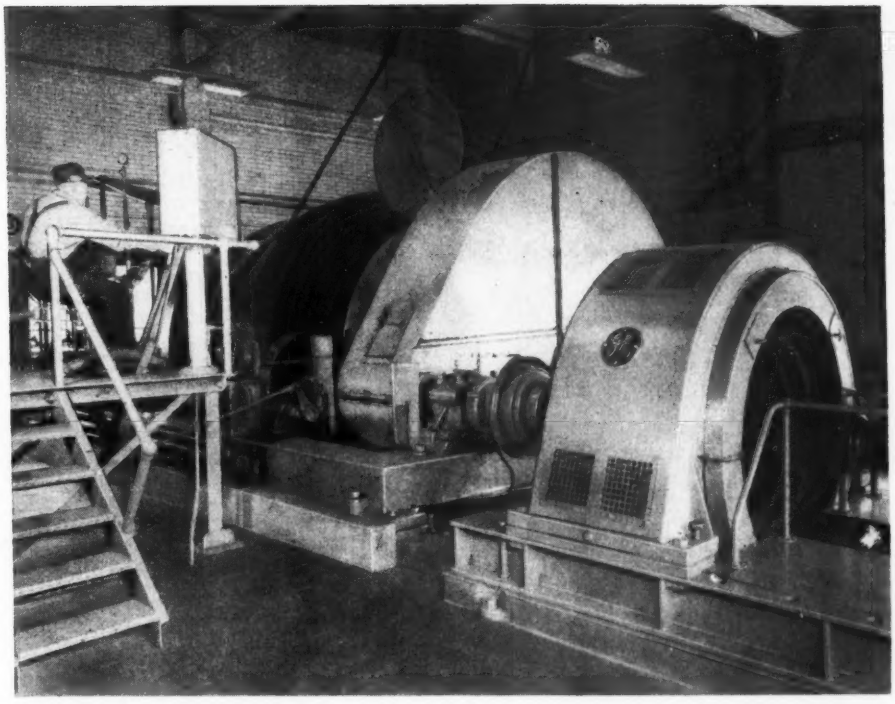
G-E secondary control, shown at right, includes secondary resistors and accelerating contactors, enabling the operator to properly accelerate and decelerate the hoist motor with the master switch.

GENERAL ELECTRIC

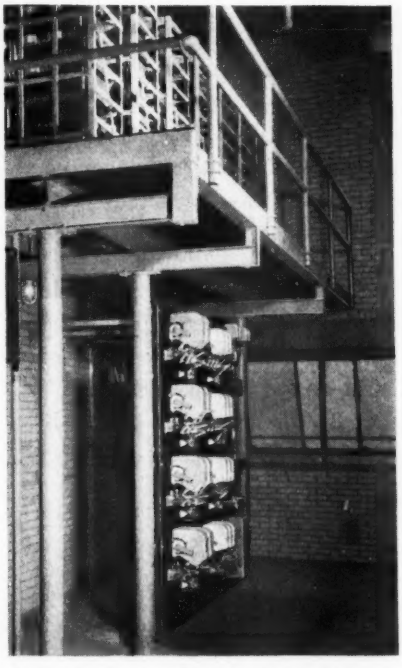
663-19

500-foot shaft...

888 trips per day!



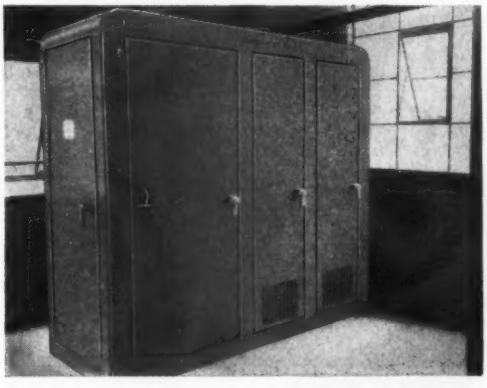
In this large West Virginia coal mine, a G-E equipped coal hoist was recently installed to increase output. Hoisting 7100 tons of coal plus 1000 tons of slate mined per day, it makes 888 trips per 14½-hour day up a 500-foot shaft. The G-E 800-hp 2200-volt a-c hoist motor shown here is giving top day-in-day-out service.



Secondary resistors for this hoist are balcony-mounted above the secondary control, providing a space-saving, out-of-the-way installation. Primary control panel (not shown) was also supplied by G.E.

To improve power factor in the mine, this G-E metal-enclosed Pyranol* capacitor equipment—rated 540 kvar, 2400/4160 volts—was also installed. G-E capacitors reduce power costs, release system capacity, improve voltage levels and cut power losses. With no moving parts, they need practically no maintenance.

**Reg. trademark of General Electric Company*



Mine-Hoist Drives

. . . to cut mining costs!

These are only two of over 900 G-E large mine-hoist drives now in service, helping to raise mine output and lower hoisting costs. For skilled help on *your* mine-hoist drive—whether it's a-c or d-c—call a G-E mining specialist at your nearest G-E office. *General Electric Company, Schenectady 5, N. Y.*

TEAMWORK IN SPECIALTIES

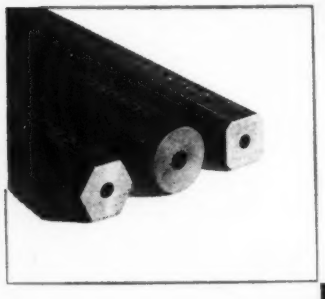
the drill runner...

CRUCIBLE HOLLOW DRILL STEEL

The drill runner is a busy guy—continuous boring through hard rock with high-speed drills. His job efficiency is dependent not only on his skill...but on the tools he uses. That's why in almost all drilling operations you'll find Crucible Hollow Drill Steel the number one choice.

This quality steel is built to take the punishment of around-the-clock operation of modern, high air-pressure rock drills. And you have the assurance of minimum breakage . . . and an end to expensive bit loss. That's because Crucible Hollow Drill Steel is backed by the experience of specialty steelmakers.

Insure the quality of your job—cut costs—use Crucible Hollow Drill Steel.



CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

HOLLOW DRILL STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

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VOLUME 38, NUMBER 1 FOR JANUARY, 1952

Indexed regularly by Engineering Index, Inc.

THE AMERICAN MINING CONGRESS
1102 RING BLDG., WASHINGTON 6, D. C.

HOWARD I. YOUNG, *President* — WORTHEN BRADLEY, *Vice-President* — ANDREW FLETCHER, *Vice-President* — WILLIAM J. JENKINS, *Vice-President* — JULIAN D. CONOVER, *Exec. Vice-Pres. and Secretary*

Published Monthly. Yearly subscriptions, United States, Canada, Central and South America, $3.00. Foreign, $5.00. Single copies, $0.30. February Annual Review Issue, $1.00. Entered as Second-class Matter. January 30, 1915, at the Post Office at Washington, D. C.

ABC
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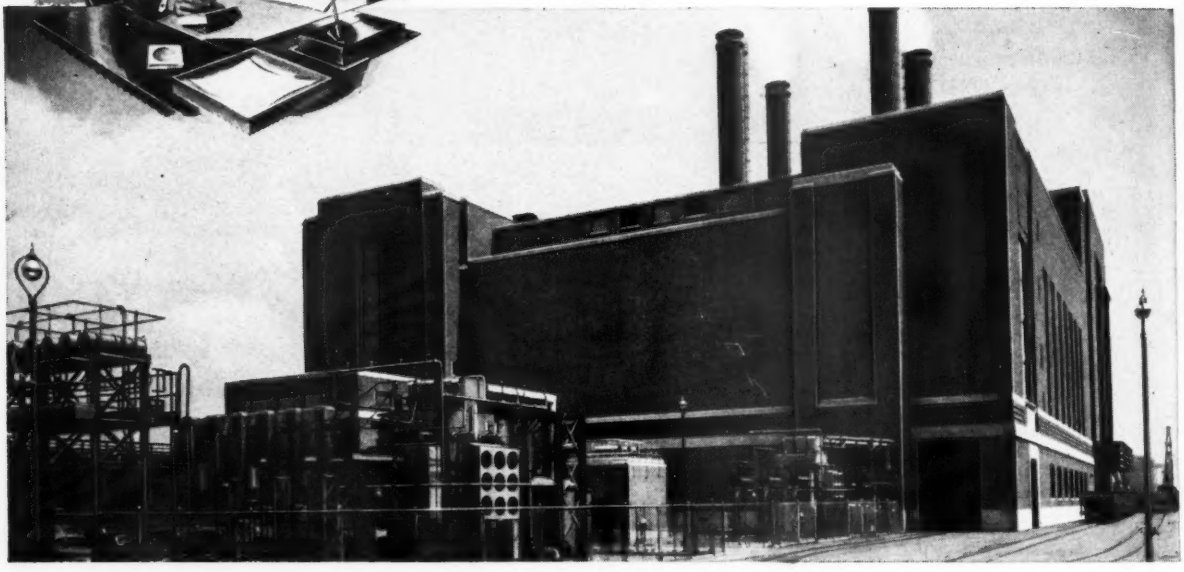
"My bet's on Bituminous—



—the kind that is mined on the B&O!"

Take a tip from executives who think in terms of fuel economy and dependability of supply. These men design their plants for the efficient coals mined in B&O territory.

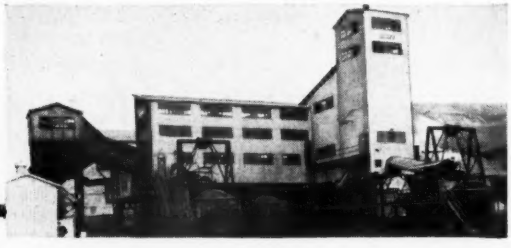
These coals, available in wide variety for all needs, lend themselves to mechanized, low-cost mining. As they are located close to America's industrial heart, transportation costs are moderate. And because their sources are *known* and *definite*, they can be depended upon for centuries to come.

Backing its faith in Bituminous, the B&O has made large capital investments in its properties. The result will be even more efficient service for the Bituminous industry and its customers.

Ask Our Man!

BITUMINOUS COALS FOR EVERY PURPOSE

from modern mines like this—→



LINKING 13 GREAT STATES WITH THE NATION B&O ®

BALTIMORE & OHIO RAILROAD

Constantly *doing things*—better!

stripping the cost on coal stripping jobs

The I-R QUARRYMASTER speeds up primary blast-hole drilling and cuts costs all along the line.

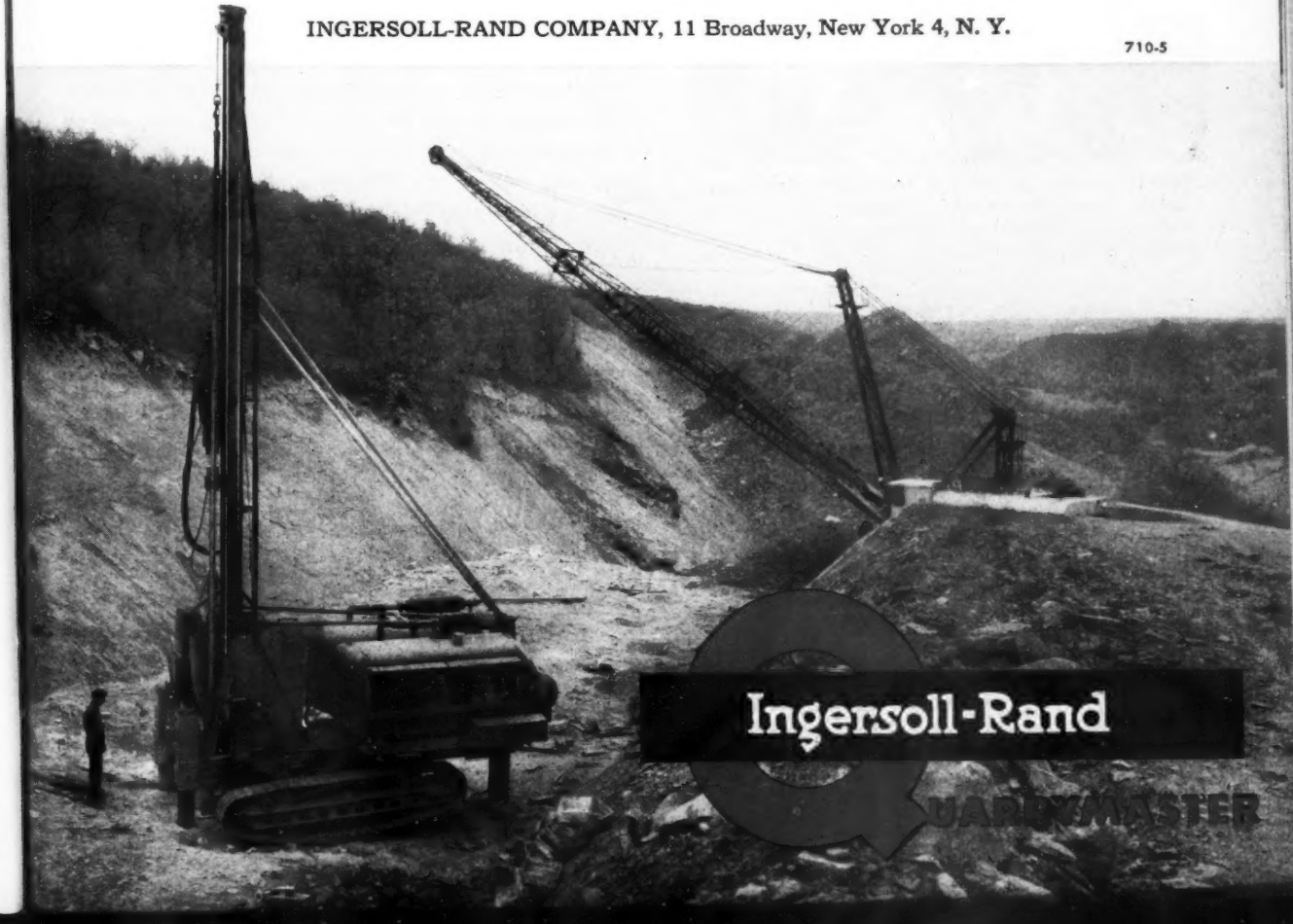
High drilling speed, low bit cost, minimum labor requirements, low service truck charges—these are but a few Quarrymaster advantages that save time and money preparing overburden. Fast drilling speeds mean large production, permitting closer hole spacing for ideal fragmentation and efficient shovel or dragline operation. Compare the following features with any other drill rig.

- DRILL ANY KIND OF OVERBURDEN—from the softest shale to the hardest granite or conglomerates.
- REAL DRILLING SPEED—drills 25 to 60 feet per hour in limestone and shale, 9 to 20 feet per hour in granites and conglomerates.
- LOWEST BIT COST—of any blast-hole drilling method. Carset Bit life from 700 to 1600 feet in granite—up to 14000 feet in the soft, less abrasive formations.
- NEEDS NO BLACKSMITH SHOP—Carset Bits are sharpened on the job. No falling off of drilling speeds because of dull bits.
- REQUIRES NO SPECIALIZED LABOR.

Ask your nearest Ingersoll-Rand representative about this completely self-contained, self-propelled outfit that drills 6-inch holes, has continuous hole cleaning, automatic rotation and is available in either diesel or electric drive.

INGERSOLL-RAND COMPANY, 11 Broadway, New York 4, N. Y.

710-5



SANDSTONE AND SHALE overburden averaging 40 feet in height. "Nitramon" is loaded in two rows of well drill holes 38 feet deep.

EASY TO HANDLE, "Nitramon" is packed in watertight metal containers which can be loaded immediately after drilling. Photo shows "Nitramon" Primer, with Primacord attached, being lowered into hole. Shot consisted of 3,000 lbs. of "Nitramon."

RESULTS OF THE BLAST show excellent fragmentation obtained with "Nitramon." Breakage such as this speeds up stripping operations . . . permits shovels to remove overburden quickly and economically.

"NITRAMON" BLAST IN STRIPPING OPERATION

PRODUCES EXCELLENT BREAKAGE

Outstanding blasting efficiency and superior safety features made Du Pont "Nitramon"* the logical selection of the Alabama Coal and Ore Co., Inc., for this stripping operation at Hanceville, Ala. The well-broken overburden obtained also proved the choice to be a wise one from the standpoint of economy.

"Nitramon"—the safest blasting agent known—is widely used for coal-stripping operations. It cannot be detonated with commercial blasting caps, and is insensitive to open flame, friction or even the impact of rifle bullets. A "Nitramon" Primer—itself relatively insensitive—readily detonates the charge. And, "Nitramon" contains no nitroglycerin . . . will not cause headaches.

The Du Pont Explosives representative in your area will gladly give you complete information on the use of "Nitramon" in stripping operations. Call on him the next time you have a blasting problem. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

*Reg. trade-mark for nitrocarbonitrate blasting agent.

DU PONT "NITRAMON"

A Product of Du Pont Explosives Research

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

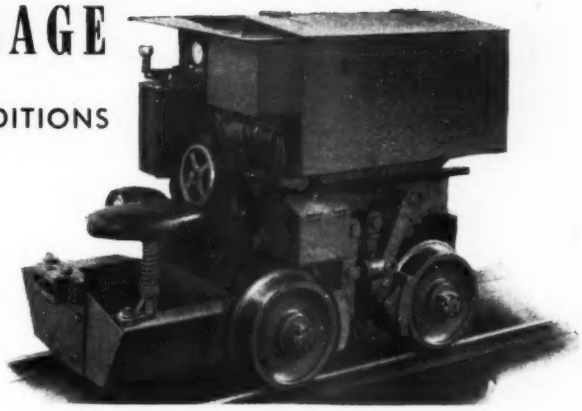
FOR LOW COST HAULAGE

A LOCOMOTIVE TO MEET ALL CONDITIONS

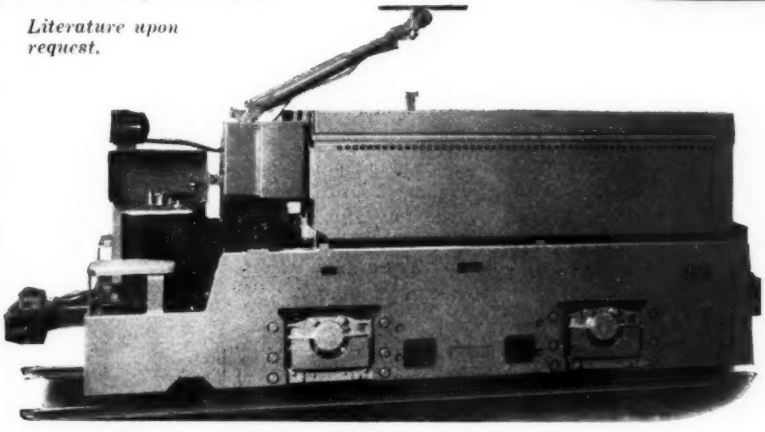
Need a Locomotive? Trammer, Trolley and Storage Battery or a combination of the latter two . . . Jeffrey builds a complete line and good ones. Whatever your requirements there is a type and size to meet all conditions in metal mining haulage or tramming.

Features—there are plenty of them . . . all that over fifty-five years of experience in design and manufacture can put into them. Three types are shown—study them—read the description of each.

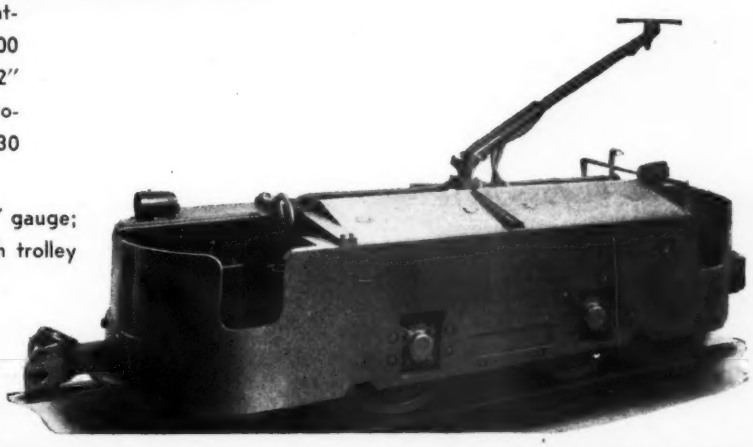
Literature upon request.



Jeffrey Trammer Locomotives are of compact construction and will meet gauges down to a minimum of 18". A storage battery Trammer is shown above—it has a 6 H. P. motor. It weighs 1½ tons and can be arranged for trolley or cable reel operation. Motorman's deck can be removed to shorten length for entering cage. 32" wide, 46" high and 62" long with deck.



Jeffrey combination trolley and storage battery locomotive with chassis weight of 12,000 pounds. 30" gauge, length 7'2", width 52" and 60" high with trolley locked down. Two-rate battery charging from trolley. Two 30 H. P. motors.



Right: Jeffrey 6-ton Trolley Locomotive. 24" gauge; length 13'8"; width 46"; height is 54" with trolley pole locked down. Literature upon request.

OTHER EQUIPMENT:

Magnetic Separators	Bin Valves	Coolers
Shuttle Cars	Feeders	Pulverizers
Conveyors	Crushers	Idlers (belt)
Bucket Elevators	Grizzlies	Belt Stackers
Car Pullers	Dryers	Transmission
Chains	Screens	Machinery

JEFFREY

ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

SUPERLA

REG. U. S. PAT. OFF.

Mine Lubricant No. 0

Cutting . . . lubrication troubles

● Operators of this midwest mine depend on SUPERLA Mine Lubricant No. 0 for trouble-free lubrication, not only in the gear cases of their three cutters, but in the transmissions of two Goodman loaders as well. This one lubricant, recommended by a Standard Oil lubrication specialist, does both jobs with equal success, and simplifies stocking of lubricants at the mine.

In three years of operation with SUPERLA Mine Lubricant there have been no cases of downtime of loaders or cutters due to faulty lubrication. Wear has been held to a minimum. Warm-up time for the loaders has been eliminated.

SUPERLA Mine Lubricant has cut lubrication troubles in this mine . . . it can do the same in your mine. There's a Standard Oil lubrication specialist located near you who knows mining equipment and how to lubricate it best. He is at your service for on-the-job help on any problem related to lubrication. Why not call on him today? Just contact your nearest Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

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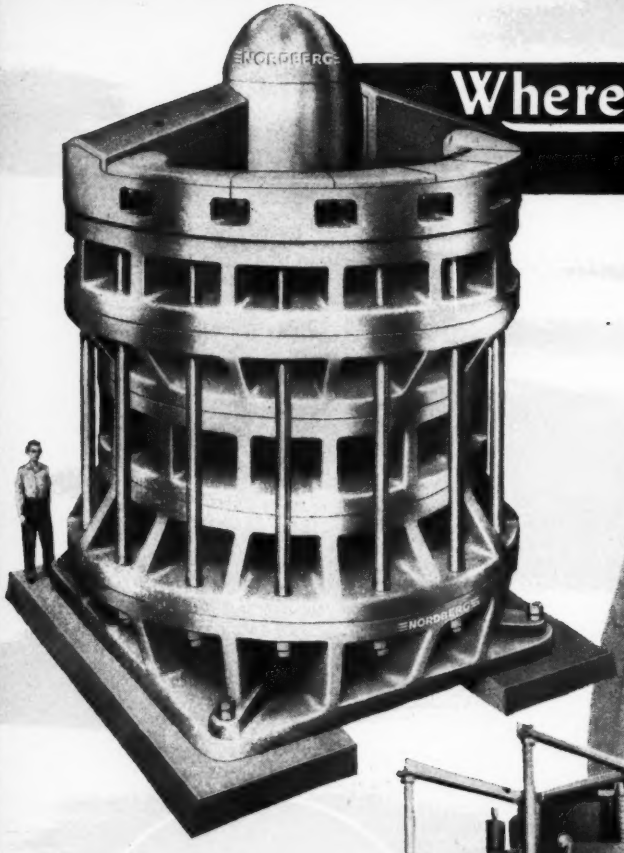
Wherever ores are processed . .



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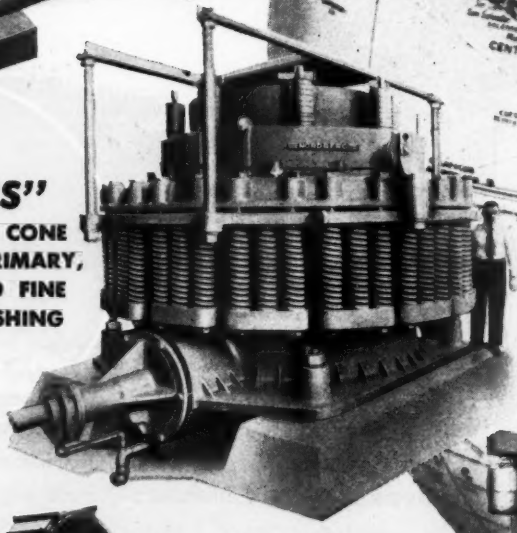
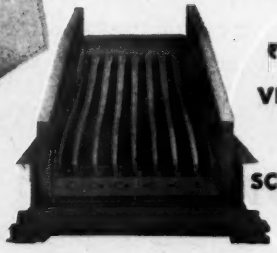
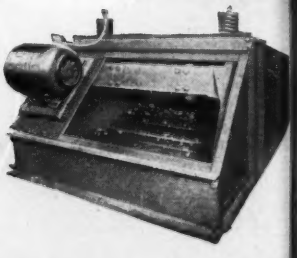
GYRATORY AND CONE CRUSHERS FOR PRIMARY, SECONDARY AND FINE REDUCTION CRUSHING



BALL, TUBE, AND ROD MILLS FOR WET AND DRY GRINDING



"SYMONS"
VIBRATING GRIZZLIES AND VIBRATING SCREENS FOR SCALPING and SIZING



FOR BASE METALS . . . PRECIOUS METALS . . .
THE RARER ELEMENTS . . . NON-METALLICS AND MINERALS . . .

NORDBERG

MINING MACHINERY

is the *outstanding choice* of producers THE WORLD OVER!

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● Without the vast ore processing operations in all parts of the globe, all industrial capacity would be seriously hampered. And without efficient, large-capacity mining machinery, these ore and mineral processing operations would fall far short of their required output.

It is highly significant that *wherever* mineral resources are found in quantity — efficiency minded producers are now using, or are in the process of installing, Nordberg Mining Machinery.

This dependable Nordberg Machinery is designed and built especially for the Mining Industry . . . and includes Mine Hoists; *"SYMONS"* Gyratory Crushers for primary breaking; *"SYMONS"* Standard and Short Head Crushers for fine reduction crushing; *"SYMONS"* Vibrating Grizzlies and Screens for scalping and sizing; Grinding Mills for wet or dry grinding; and a complete line of heavy duty Nordberg Diesel Engines in sizes from 10 to 10,000 H.P.

Write for literature on the machinery you need.

MINE HOISTS

DIESEL ENGINES
2 and 4-cycle—
10 to 10,000 H.P.
Burn Gas, Oil or any combination of both

"SYMONS" . . . a Nordberg trade mark known throughout the world.

NORDBERG MFG. CO.
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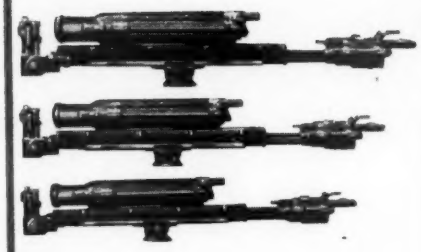
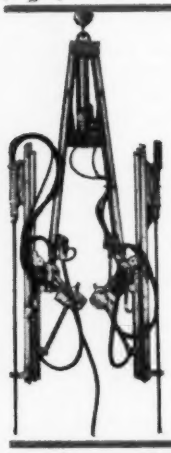
NORDBERG MACHINERY

★ Air-feed sinkers — 2-way feed, 2 sizes. They take the back-breaking work out of drilling horizontal holes, lighten the load on your miners, and increase tonnages.

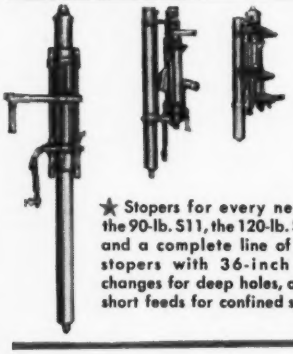


★ Power-feed and hand-cranked drifters. Dependable, powerful, and fast. Ideal for columns and jumbos alike.

★ A complete line of sinkers from 18 to 80 lbs. including the popular 45-lb. H10, and 55-lb. H111.



★ The SDR 34 shaft sinker for faster shaft sinking. Fully closed it's 5'6" between drill centers; open 19'3". All adjustments quickly made with air motor.



★ Stopers for every need — the 90-lb. S11, the 120-lb. SS-22, and a complete line of offset stopers with 36-inch steel changes for deep holes, or with short feeds for confined spaces.

It's Le Roi-CLEVELAND

for

Rock Drills You Can Count On

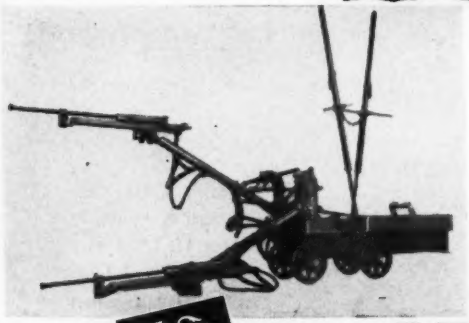
. . . . . fast-drilling, dependable favorites of mining men since 1906

Of course, you know that Le Roi-CLEVELAND builds the popular, easy-holding H10 and H111 sinkers... the fast-drilling PD24, 25, and 14 power feed drifters . . . the S11 and SS22 stopers with trip rotation for easier handling . . . and a mine jumbo that lets you drill out your rounds faster, with greater safety.

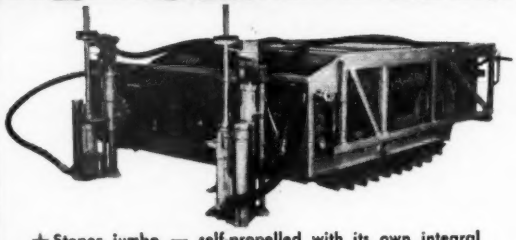
But did you know that Le Roi-CLEVELAND was responsible for some famous "firsts"? Here are a few of them—work-savers that help your miners increase their man-shift production: the air-feed sinker, the offset stoper, the shaft sinker, the stoper jumbo.

So if you have a job of drilling to do—do it with Le Roi-CLEVELAND machines. You can count on them. They're built for speed. And they're built to stay underground, too — where you can use this speed to do more work and cut your costs.

Detailed information about the complete Le Roi-CLEVELAND rock drill line is yours for the asking. Just write us.



★ The famous MDR Jumbo with air-motor powered booms for quicker set-ups, greater safety, faster rounds.



★ Stoper jumbo — self-propelled with its own integral dust-collection system for positive dust control, the latest thing for roof bolting.

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RD-39

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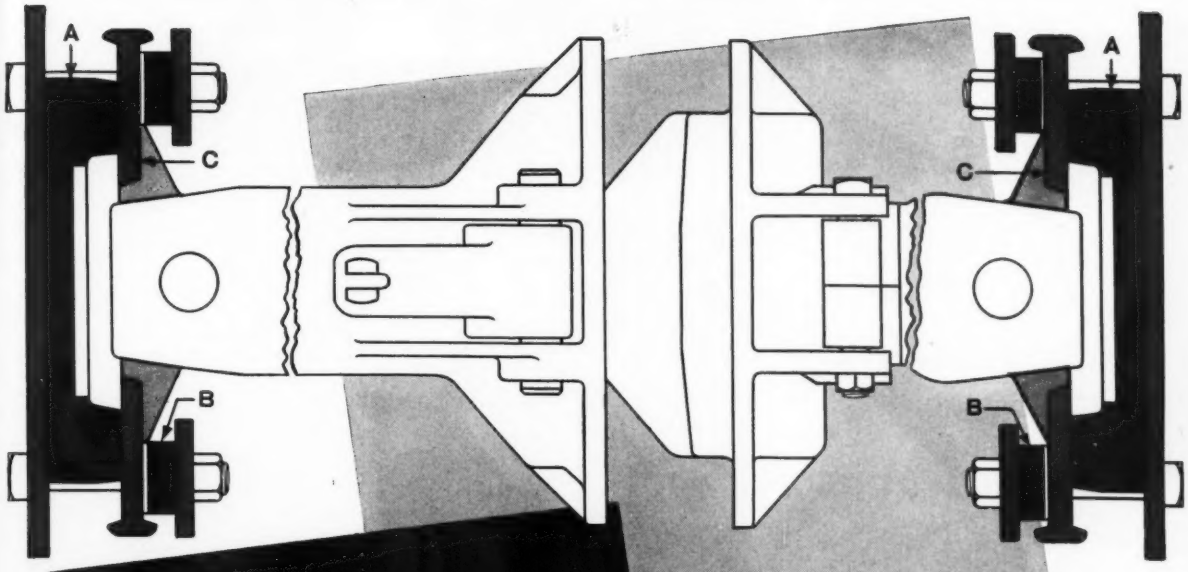

A - Rubber Buffing Pad
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When couplers take the beating!

O-B Automatic Mine Car Couplers, with their durable rubber draft gear, absorb the jerks and bumps of coupling and haulage operation, and protect the car from these shocks.

Dead slack in a mine car coupling allows the cars to give one another the worst sort of punishment as they surge and jerk in a moving trip. Naturally, maintenance costs go up, and car life decreases when each trip means a beating for the car. These are the reasons why the coupler draft gear is of such importance.

Resilient rubber draft gear gives all-around support to the clevis casting in O-B Automatic Mine Car Couplers. This gear also prevents uncontrolled movement between the car and the coupler. Thus dead slack is eliminated without creating a rigid coupler mounting. Instead of beating the cars, haulage blows are spent in compressing these sturdy rubber blocks in the O-B draft gear. These are the reasons why you'll do well to consider O-B Automatic Mine Car Couplers when you replace couplers or get new cars.

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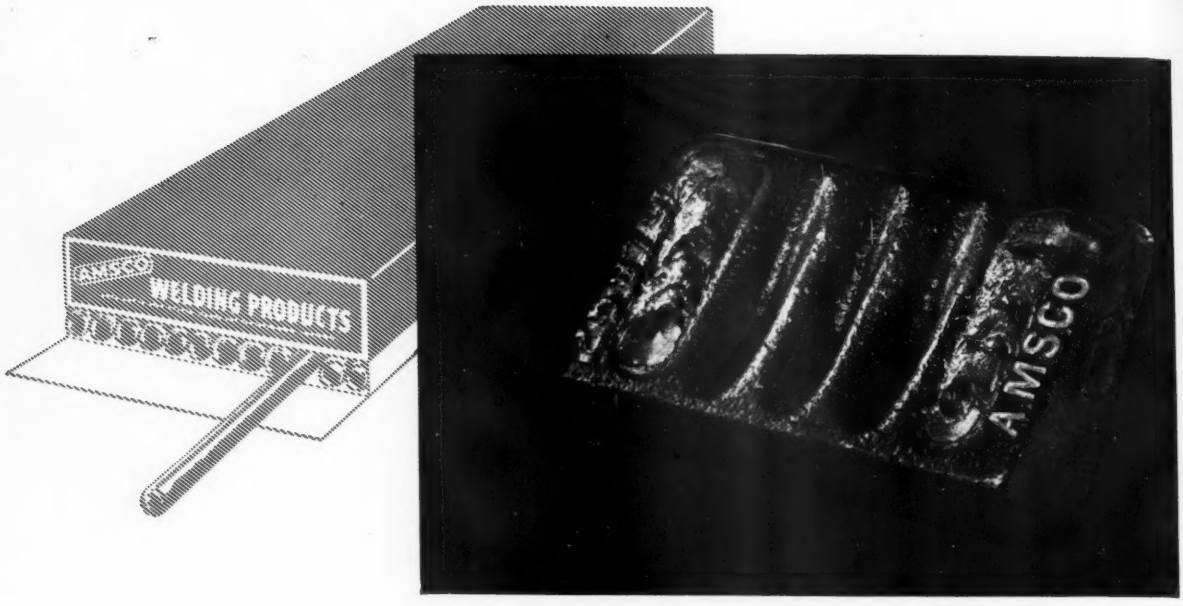
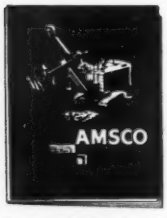


NOW! Wear your point and have it too!



This new catalog can help you save money on repair costs . . .

It's packed with information on the new "Wear-Sharp"—and the entire AMSCO Weldment line. Complete with installation instructions and helpful hints on welding. Be sure to ask for your free copy.

AMSCO "Wear-Sharps" are available in two quickly and easily installed types:

Crescent Back
For application to worn tooth with minimum fitting.

Straight Back
For application after worn tooth is beveled.

U. S. Pat. No. 2,247,202

New AMSCO "Wear-Sharp" repointer holds a straight edge as it wears . . . and stays sharp longer!

Here's a new tooth repointer that is just what you've been looking for . . . the AMSCO "Wear-Sharp", *and it does exactly what the name implies.*

Note the groove design on this new repointer shown above. The outside and end grooves are AMSCOATED with Amsco Hardfacing Electrodes specially recommended for this purpose, while the inner grooves are left as they are. Result?

The Amscoated grooves wear slower, thus equalizing wear along the entire cutting edge and making the point stay sharp longer. Rounded, blunted corners that cut digging efficiency and waste power are completely eliminated for the life of the repointer!

The "Wear-Sharp" is already setting new records in service life and digging efficiency. For example, an Eastern mine reports *6 times longer service than any repointer ever used before.*

The next time your dipper teeth need repointing, try the new "Wear-Sharp"! Write today for illustrated catalog shown at left—and name of your nearest AMSCO Distributor.

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WITH YOUR STEPPED-UP PRODUCTION

Today's conditions call for trucks that can keep pace with accelerated production schedules. More and more truck owners are realizing that trucks are really "Tools of production"... that intensified service makes doubly important the extra durability and sustained reliability they get from hard-working Macks.

Make sure *your* truck equipment measures up to the rigors of present-day demands. See your nearest Mack branch or distributor for the right truck for your particular job. Prove to your own satisfaction that "Built Like A Mack" means uninterrupted production... extra long life... more tonnage moved at lower cost for many years to come.

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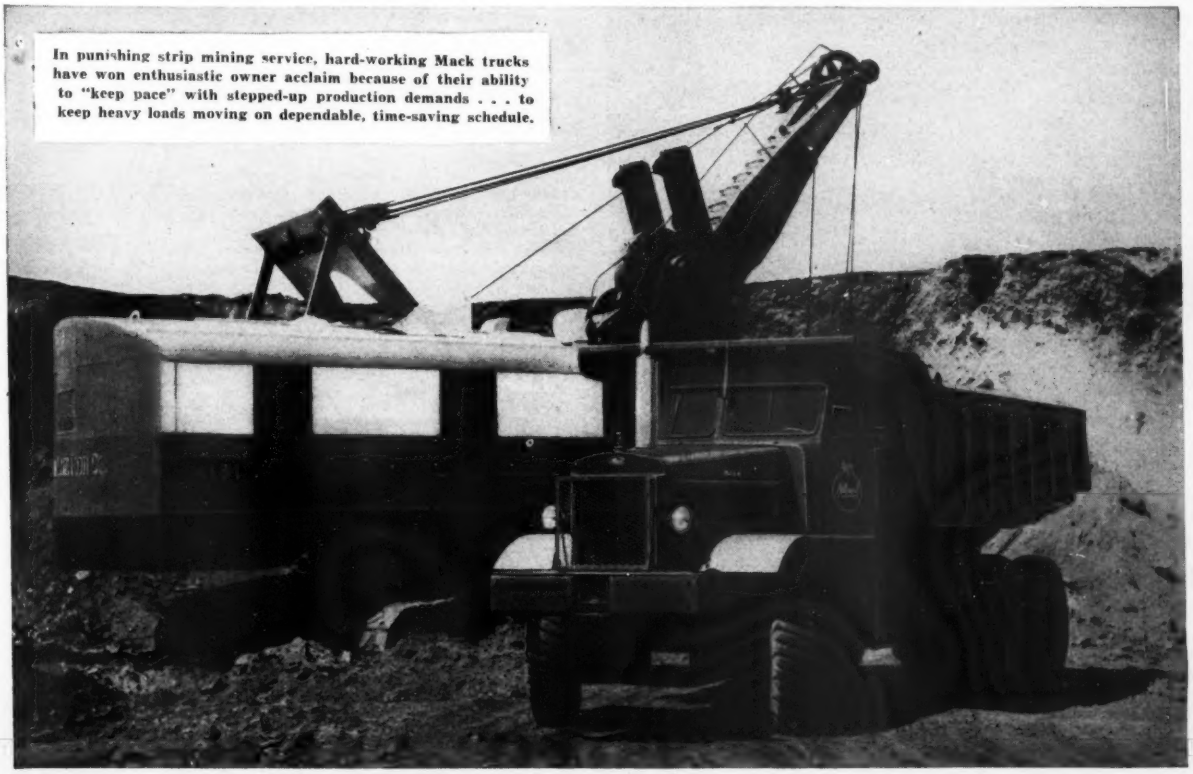
Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



In punishing strip mining service, hard-working Mack trucks have won enthusiastic owner acclaim because of their ability to "keep pace" with stepped-up production demands . . . to keep heavy loads moving on dependable, time-saving schedule.

You get *DOUBLE DUTY

JOY TELESCOPIC FEED STOPERS

The S-91T provides a steel change of 36", compared with the 18" change of conventional stopers. In most mining conditions, this long feed will give more drilling time, with fewer steel changes and fewer lengths to stock.

At left, the Joy S-91T Stoper in operation; above, with telescopic feed leg retracted; right, with leg extended, giving a 36" drilling feed. Another feature, instant; "thumb-flip" rotation release, provides safety and easy spotting of holes.

JOY

HAND-HELD DRILLS

A complete line of well-balanced, compact drills, ranging from 27 to 67 lbs. in weight.

The L-57 and L-67 Joy Hand-Held Drills are also available with mounting brackets for use as light drifters, or for wagon drill mounting.

Joy Jibs are hydraulically controlled booms for drill mounting on Jumbos, or on rubber-tired, self-propelled Drillmobiles.

JOY HYDRO DRILL JIB

Air-hydraulic control of all jib movements eliminates heavy lifting, and permits more accurate hole spotting for more efficient use of powder and controlled breakage.

OVER 100 YEARS OF ENGINEERING LEADERSHIP

with JOY DUAL-VALVE SILVER STREAK DRILLS

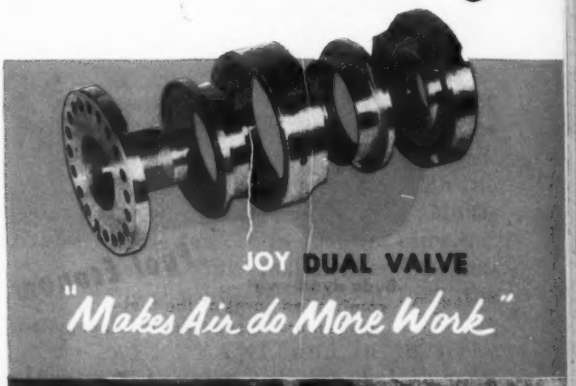
*Maximum Footage–Maximum Economy

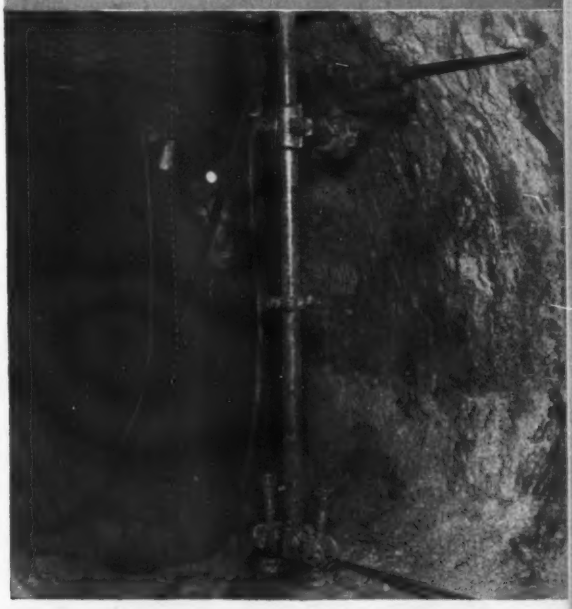
In tunnels, crosscuts, drifts, or stopes, Joy *Silver Streak* Rock Drills with the DUAL VALVE will do your drilling job faster, and use less air with lower maintenance. Here's why—

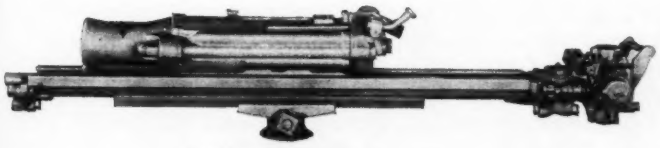
(1) The exclusive DUAL VALVE, a feature of all Joy rock drills, makes air do more work. By admitting the correct amount of air behind the piston and excluding air ahead of it during the drilling stroke, maximum force is exerted on the drill steel. There's no cushion of air ahead of the piston to reduce the force of the blow. Then the rear section of the Dual Valve meters the correct amount of air ahead of the piston to force it back with a "snappy" rotating action. This adds up to more power-packed strokes per minute, for faster drilling with less air.

(2) The silver-like cadmium plating on Joy *Silver Streak* Rock Drills aids lubrication while running-in, protects parts from rust while in stock, and keeps maintenance costs at a minimum.

The Joy line is complete. There's a *Silver Streak* rock drill for every rock breaking need. Shown here are drifters, stopers, hand-held drills, Hydro Drill Jibs. To complete the line, there are wagon drills; the QB-20 for line drilling and dimension stone quarries; rubber-tired, self-propelled Drillmobiles; and specially mounted drills for special needs.
● ***Let our Field Men work with you.***







JOY **DRIFTERS**

For column mounting, as at right, or for use on mobile jumbo units, Joy Drifters are built in three sizes—all with fast, powerful Dual Valve action. Efficient Pistonmotor Feed, with only two moving parts, provides strong, steady advancement and retraction. One-piece locking chuck increases bearing area and reduces wear on lock ring and chuck bushing.

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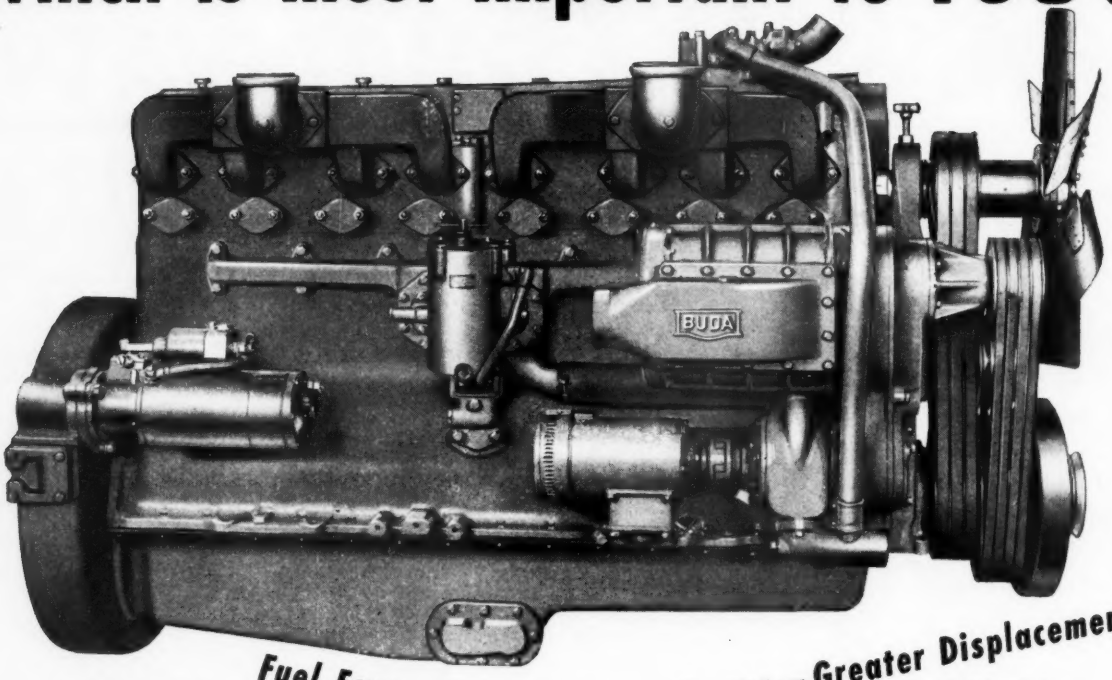
Which is most important to YOU?



Fuel Economy

Buda dyna-swirl combustion burns *all* the fuel—gives more horsepower hours per gallon

More Power—Greater Displacement

Buda Diesels have 13 to 25% more displacement—more power with greater reserve

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You get 10 to 17% more torque at normal speeds—less shifting—faster trips

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Buda Diesels are averaging more than 6000 hrs. in toughest service

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Buda Parts and Service Facilities close to your operations

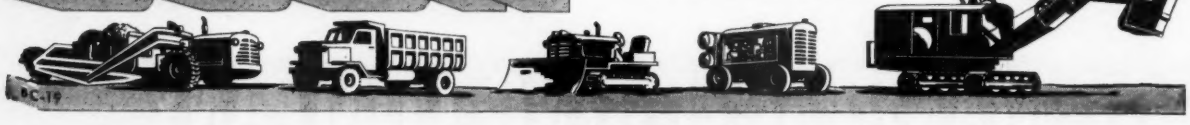
If it means MORE PROFITS... BUDA'S GOT IT!

Any way you figure it . . . the great new line of Buda dyna-swirl Diesels gives you more for your power dollar—more positive advantages that add up to profitable operation.

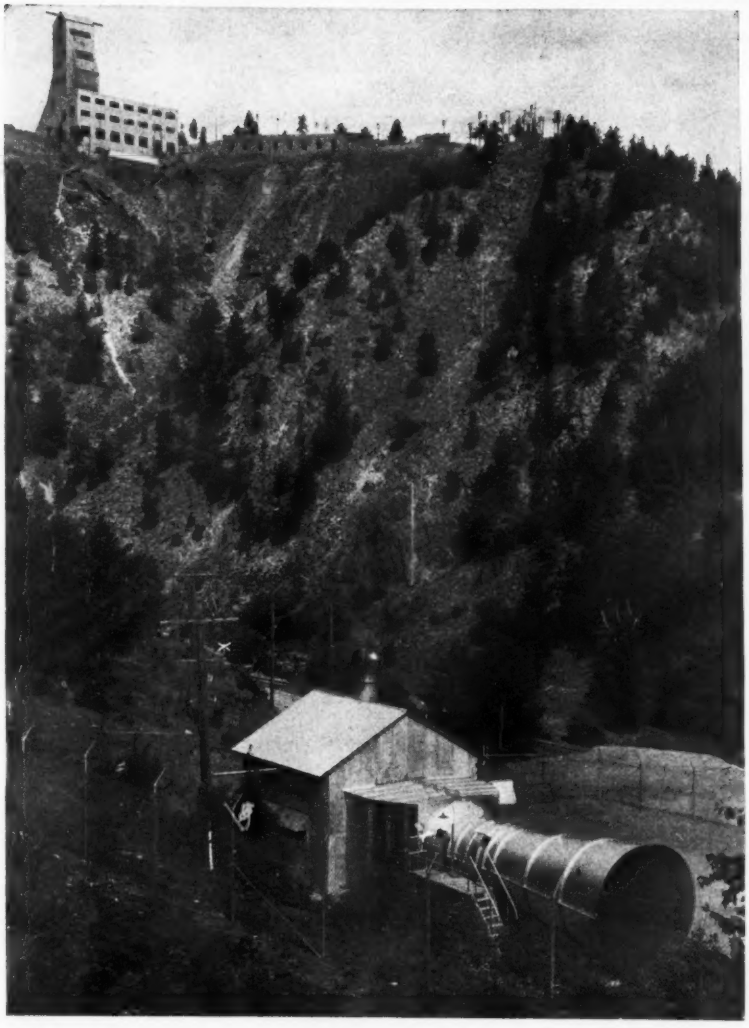
Get the facts today. They speak for themselves. Ask your nearby Buda Engine Distributor. Write for Bulletin 1526 and complete details. *The Buda Company, Harvey, Illinois.*

BUDA

a Power-Full and Dependable Engine
FOR EVERY NEED



DC-19



LARGE VOLUMES of AIR AT LOW COST

Here you see a Jeffrey AERODYNE Mine Fan serving a large Metal Mine in South Dakota. It is an 8H- 84", two-stage fan and is being used for delivering large volumes of air when and where needed.

Jeffrey is no newcomer in the Fan business. In 1893, when we first offered a fan for sale mine fans generally left much to be desired. In 1907, Jeffrey came out with the forward curved Stepped Multi-Blade fan . . . in 1915 we came out with a Universal Blower for auxiliary ventilation . . . in 1928, the RETROVANE . . . in 1931 the AEROVANE and in 1936 the AERODYNE, designed along aerodynamic principles.

The AERODYNE is a fan of high efficiency and real economy for greater pressures and volumes. During the past 75 years over 5,000 Jeffrey fans, for both coal and metal mines, have been installed in all parts of the world.

For Blowing or Exhausting . . . for the best in Ventilation . . . call upon Jeffrey Ventilation Engineers . . . they have experience.

PRODUCTS for the METAL MINE

Chains
Drills
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Literature upon request—covering any of the items mentioned—send for it today.

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ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

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WESTERN
CONTRACTING
CORPORATION
GET THE DETAILS FRO

CLEAN COAL TAKEN OUT

without

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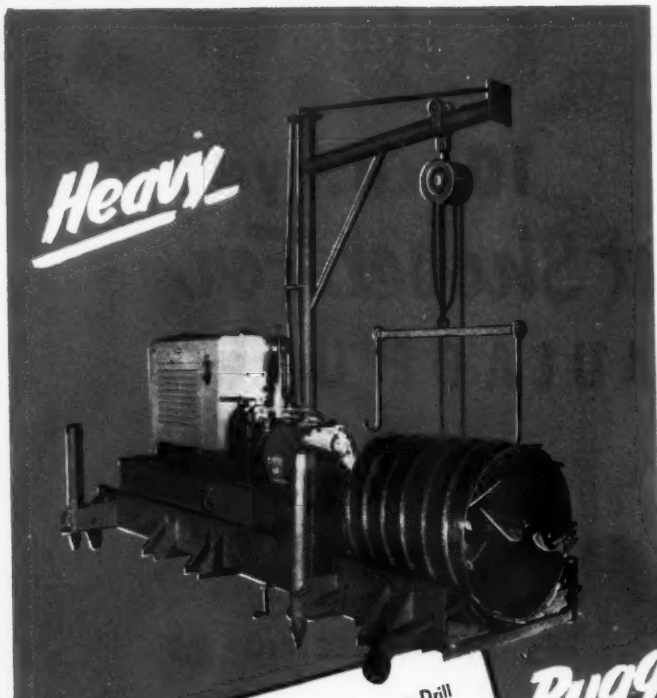
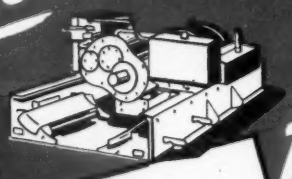
McCARTHY

COAL RECOVERY DRILLS CUT MINING COSTS

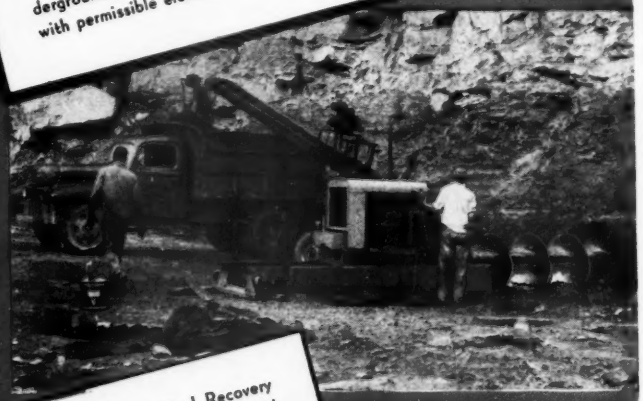


• McCarthy Coal Recovery Drill shown with 36-inch auger, Lump Drill Head, Auger Retriever and Auger Hoist.



• Compactly designed McCarthy Underground Coal Recovery Drill equipped with permissible electric motor.

Powerful



• Use McCarthy Coal Recovery Drills and you can mine, load and ship coal all in one continuous operation without considering cost of removing overburden!

● Here's a combination drill and screw conveyor unit that pulls continuous streams of clean coal right out from the heart of the vein without removing overburden!

McCarthy Coal Recovery Drills are built for both strip and deep mine operations. They work easily to horizontal depths 60 feet deep or more to deliver an average daily output amounting from 15 to 50 tons per man per shift.

McCarthy Coal Recovery Drills are ruggedly built, equipped with finger-tip hydraulic controls and gasoline, electric or diesel power units.

Special gear ratios provide for a smooth, steady bite with six or twelve-foot interlocking Salem auger sections of 12, 16, 20, 24, 30, 36, 42 and 48-inch diameters.

Write today for the full story on the revolutionary new McCarthy Coal Recovery Drill . . . a tool that day in and day out, delivers 15 to 50 tons of clean coal per man per shift!

50th year

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Editorials

Volume 38 JOHN C. FOX, Editor January, 1952

Our Country's Pride

ANOTHER year has rolled around. Father Time's scythe has taken a number of beloved colleagues, whom it will be hard to replace. Soldiers of the United Nations are in the midst of another freezing winter in battle-torn Korea. The defense mobilization program is swinging into high gear. On every hand there are evidences of advances made. Plans which a year ago were scarcely dreams have marched through the drawing-board and engineering stages to construction, and in some cases to actual production.

Final coal production figures may reach 535,000,000 tons of bituminous and 41,000,000 tons of anthracite. Steel producing capacity has continued to expand toward the 118,000,000-ton mark set for 1953; new facilities as well as old have been producing at record rates to meet the demands for industrial expansion. To supply the 135,000,000 gross tons of iron ore that will be needed, the iron ore industry is increasing output from active domestic fields, new foreign fields and speeding up the development of taconite.

Aluminum capacity has been increased tremendously over the pre-Korea peak, and presently approved expansion plans will add 600,000 tons per year to the supply of this vital metal.

Copper mining companies have plans under way to add some 225,000 tons yearly to present production by 1955, but not much increase can be expected until then. In addition to these advances toward a balance between demand and supply of these metals, significant strides have been taken in the effort to meet the requirements for zinc, lead, uranium, molybdenum, manganese, sulphur and the many other metals and minerals that are indispensable to our complex civilization and our national strength—strength in the only way the leaders of the U. S. S. R. and her satellites can understand.

But lest optimism lead us too far, we must not forget that such strength has its price. First claim on any increases in production from mines, mills and factories must belong to the military and Atomic Energy programs. Those directing the tremendous effort of all industry warn that consumer goods will be in shorter supply in spite of increased production of basic materials. The men and women who are producing the vast amounts of fuels, metals, minerals and manufactured goods needed to supply our own military machine and those of the friendly nations, will have a greater potential purchasing power than this world has yet seen. This concentration of purchasing power can easily turn into the most dangerous enemy our country has ever faced. We are the last free community on earth. If we bring on runaway inflation by selfish competition for consumer goods, we might seriously undermine the way of life that has brought freedom-loving peoples from all lands to our shores, and unwittingly cause *life, liberty and the pursuit of happiness* as we know them to vanish from the earth.

We have seen governments in Europe and Asia crumble and fall, destroyed by the enemy from within—Inflation. That it can happen here is amply illustrated by the halving of the purchasing power of the United States dollar in the past decade. Inflation can still be stopped but only through the exercise of restraint and unity of purpose on the part of all Americans.

Now is the time for us all to make a firm resolve:

To buy only what is necessary;

To question critically the motives of any pressure group making demands that would increase production costs—hence prices;

To try conscientiously to produce more today than yesterday, and more tomorrow than today;

To save the rewards of such increased productivity against the time when industry can once more turn its attention from swords to plowshares.

And finally to remember (to paraphrase a famous poem) that—

A strong economy, our country's pride,
When once destroyed can never be revived.

Head frame carried aluminum sinking crosshead, bucket and dumping bin

Apply Freezing Method in Potash Field

Effectively Consolidate Flowing Quicksands to Sink Shaft near Carlsbad, N. M.

By RUSSELL G. HAWORTH
Resident Manager
Potash Co. of America

POTASH Co. of America operates a mine and refinery approximately 20 miles east of Carlsbad. Initial development consisted of two shafts (No. 1 and No. 2) sunk in 1934 and 1936. Neither of these shafts encountered flowing quicksands but it was found necessary to use concrete lining in all but a small portion of the section above the salt, a distance of approximately 400 ft. Both shafts were difficult to sink due to several zones of sandy material and heavy flows of water, up to 900 gpm, in limestone, dolomite and gypsum formations. There is no outlet for surface drainage in the area and all rainfall that does not evaporate descends through sinkholes and various channels to limestone, at a depth from 300 to 350 ft. The lower limestone, the Culebra of Permian age, is the aquifer which apparently drains the excess water from the area. The water level in the basin formed by surface topography stands at approximately 50 ft.

In September, 1947, No. 3 shaft was started approximately two miles north of the two original shafts, and No. 4 shaft, two miles south, was started a month later. One test hole had been drilled within 150 ft of each shaft and this work indicated that, in general, sinking could be done under approximately the same conditions as at the first two shafts. Plans were made to grout water-bearing zones, ahead of sinking, from the bottom of the shafts in order to eliminate pumping large flows of water.

No. 3 shaft encountered a water-bearing sand at 50 ft. Although it was not a flowing quicksand, many difficulties developed in supporting the concrete lining and work was suspended at 75 ft. Grouting was unsuccessful, having been attempted in the zone from 52 ft to 70 ft. Approximately 1000 sacks of cement were used under high pressure. The cement was forced outward through small water-bearing channels along bedding planes in the sands. No consolidation of the sand was effected.

Shift to New Site

Crews were transferred to No. 4 shaft, where cuttings and information from the test holes indicated good ground for sinking. Gypsum and anhydrite beds, containing little water and one 10-ft sandy bed, were shown in the test hole from 90 ft to the limestones. As sinking progressed, small fissures with heavy flows of water were found at 100 ft and these were grouted off. Below this point, the fissures were filled with sand and it was necessary to wash this out before grouting. Finally, a large solution cavity, filled with flowing quicksand which gushed up through two-in. jackhammer holes, was encountered at 125 ft. A test hole was drilled close to the shaft and cores were taken from the solid section. This test hole showed that solid, dry anhydrite could be expected below 180 ft and that the cavity bottomed at 130 ft. Sinking was accomplished by first bleeding sand out through closely spaced drill holes which were capped with pipe and replacing the sand with grout. Work was very slow and expensive by this method and it was decided to suspend operations for further investigation. Use of sodium silicate had already been studied and tests made in the shaft showed that this method of consolidation was not satisfactory either.

Decide on Freezing Method

When it was decided that freezing was the only feasible method to consolidate the quicksands, several weeks were spent in England, France and Belgium, visiting several shafts which were being sunk by the freezing method as well as others being sunk by grouting. A number of engineers, who had experience in shaft sinking using both methods, were contacted and a review of technical articles was made.

Further test work at No. 4 shaft showed that vertical sinkholes filled with quicksand existed along the south side of the shaft, although test holes on the north side were in dry anhydrite for much of the distance.

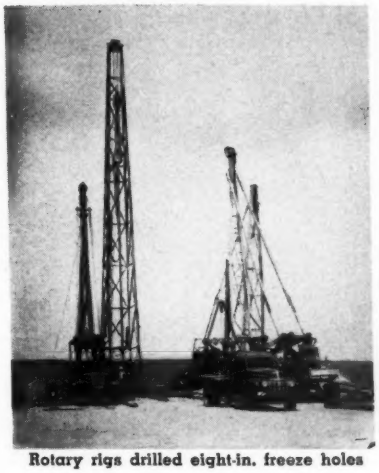
A decision was then made to find a new location. Several test holes were drilled and similar conditions were

found to exist. The South (No. 4) Shaft was located near a large sinkhole appearing on the surface, but a ring of test holes around the shaft site indicated that relatively small solution cavities containing quicksand would be encountered. Special tests were made in churn drill test holes to determine water flows at various horizons. Data from these tests, as well as from cores from other test holes, led to the conclusion that the safest method as well as the cheapest would be to freeze the shaft zone before sinking.

Drilling of Freeze-Holes

Methods ultimately adopted in drilling freeze holes and in lining the frozen ground differed in several respects from that in use in Europe and England. At the South Shaft, holes 8 in. in diam. were drilled on the circumference of a 31-ft diam circle around the center of the shaft location. Holes were spaced 3 ft 5¾ in. apart, center to center. Twenty-eight holes were drilled to a depth of approximately 360 ft, just below the deepest water-bearing formation which was an unconsolidated sand and silt, 40 ft thick and containing a flow of water in the lower 2 to 4 ft. In drilling test holes, with a churn drill, the water rose in the hole from the water horizon, causing the entire 40 ft to cave.

Churn drills were not successful in drilling straight holes in the formation in question. Rotary drills were more successful but much care was required in surveying the holes and it was necessary to drill slowly to keep the holes straight. Complete drilling data from final surveys were made by a company specializing in directional drill-hole surveys. Each hole was checked each 50 ft by an instrument which indicated the amount of deflection but not the direction. A single string of six-in. casing was run in each hole. This string was welded and the bottom sealed with a welded plate. None of the casing was cemented. Two-in. pipe was run down inside the six-in. casing. A hole was drilled in the center of the shaft to take a six-in. casing. In this pipe a number of slots were cut to provide openings to drain water caught inside the frozen zone.



Rotary rigs drilled eight-in. freeze holes

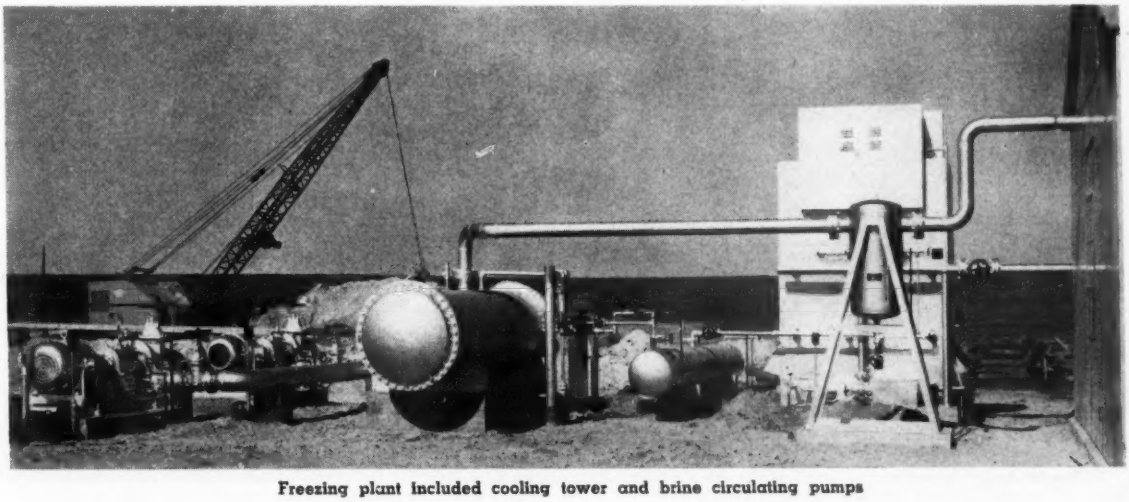
Use Brine Plant

The refrigeration plant consisted of two ammonia compressors driven by 100-hp, 2300-v motors. Heat of compression was removed in a small cooling tower and the condensed ammonia collected in a small tank. A shell and tube brine cooler was provided, where the evaporating ammonia cooled the brine circulated through the cooler. The brine was a CaC_2 brine (1.26 sp gr) and it was pumped by either of two 1000-gpm centrifugal pumps with 50-hp motors to the brine header.

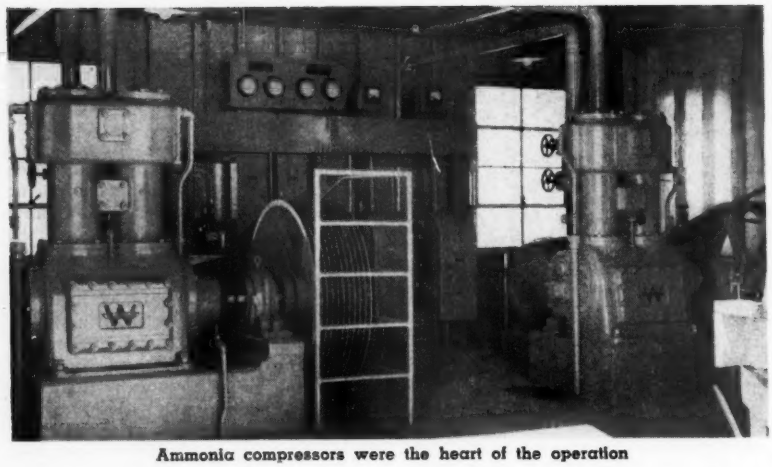
The tube in each freeze hole was connected to the brine header which consisted of an eight-in. pipe ring outside the circumference of the ring of drill holes. These tubes were provided with valves to regulate rate of flow of brine in each hole so that the return brine from all holes could be adjusted to approximately the same temperature. These pipes passed through a seal over the top of each outer six-in. casing. The cold brine passed rapidly down the small tubing, returning at a slower rate through the six-in. casing. This was done to obtain a cold brine at the bottom of the hole and to reduce rate of heat exchange between the two columns of brine. Control was established by regulating valves on the two-in. brine inlet pipe so as to obtain the same outlet temperatures on all holes and hence uniform ice formation. Return brine flowed from the six-in. casing in each hole to a second eight-in. circular brine header from whence it was piped through the brine cooling system.

The refrigeration plant was placed in operation and seven days later brine temperatures, as indicated by thermocouples at the bottom of the holes, were six deg F. Thermocouples were used at the top of the casing to record exit brine temperature from each hole also.

Cylinders of ice formed outside the six-in. pipes where water was present and complete closure of the ice shell around the shaft was completed 48 days after start of the brine circulation. Closure was indicated by water forced upward in the perforated center pipe from water-bearing strata due to the ice wall moving inward. Since the water inside the ice shell was provided an exit through this center hole, there was no heaving of the ground due to expansion during ice formation. Level of the shaft collar and casing was checked during this period and no ground movement was noted. It cannot be assumed that, in every case, the method used at the



Freezing plant included cooling tower and brine circulating pumps



Ammonia compressors were the heart of the operation

Potash Co. of America shaft would assure protection from ground movement during freezing.

Shaft Design Unusual

Design of the shaft is not orthodox due to the fact that it is primarily a ventilation shaft with provision for handling upcast air in one compartment and downcast air in the other. This shaft is circular to provide maximum strength, and is 15 ft inside diam. A continuous center dividing wall of concrete will be provided to separate the two compartments.

One important feature is the provision for separate 25-ft concrete ring lining sections through the water-bearing zone. Each is self-supporting with a bearing hitch at the bottom of the section. Above this hitch, where the concrete was poured in contact with the frozen ground for a distance of four feet, is a section where corrugated roofing was used as a lining during sinking. This feature maintained an air space between the concrete and the frozen ground to prevent possibility of freezing of the concrete, and provided openings for later grouting. It also served as temporary support for protection from any loose rock. A ring of nine evenly spaced grout pipes was set every five ft in the forms before pouring the concrete.

Although temperature measurements in the ground and in the concrete indicated that it would have been possible to pour concrete against the frozen ground without danger of freezing, and although laboratory tests indicated that such was the case, it was thought safer to proceed as outlined.

Recently, a very interesting German reference has been found, where this subject is discussed. The conclusion reached was that a special type of concrete will reach 80 percent of normal strength when poured against frozen ground.

Lining Poured in Sections

In Europe, most shafts, if not all where freezing is employed, are lined with cast-iron tubbing and with a final grout seal after thawing is completed. The independent 25-ft pours at Potash Company of America were designed to solve the problem of ground movement during thawing. It was thought that, if any of the zones observed during sinking or freezing exhibited evidence of lifting due to expansion of the ice, the formations could then return to their original position without stressing the lining. At the top of each pour a pre-molded material ½ in. thick was provided for an expansion joint. Several joints were made with this material. When no evidence of ground movement could be found, the joint was merely coated heavily with asphalt. A vulcanized, rubber water seal was located in each joint. It consisted of a strip of rubber approximately nine in. high which was set in the forms so that it was fastened into each pour. A hollow tubular section in the center of the strip was located at the joint to allow for any expansion or contraction.

Grout Behind Lining

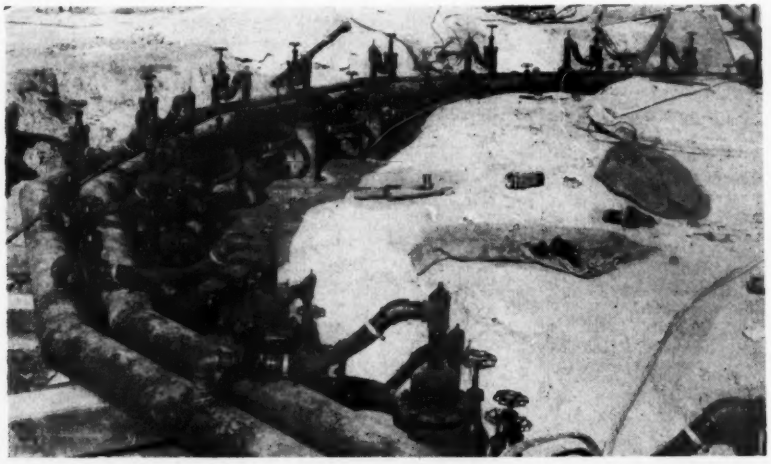
Since no movement of the beds was noticeable, it was decided after sinking through the frozen zone to grout behind the rings before thawing of the ice wall was complete. The ground was allowed to thaw back a few inches in most of the zones before grouting. This step assured setting of the grout without freezing, with a consequent maximum bond between the ground and the grout. The ice wall prevented grout from flowing outward through fissures or cracks.

Some question remains regarding the success of the design in shafts where marked uplifting of the ground would occur during freezing with subsidence to original position upon thawing.

Sink Without Difficulty

Equipment and methods used during sinking were conventional for the most part. The sinking crew consisted of six men on each shift on the bottom of the shaft and a toplander and hoistman on the surface. Some mechanics were employed and one operator on each shift was required to operate the refrigerating equipment.

No shaft mucking device was used, partially due to the fact that a crew of the size mentioned was required for setting reinforcing steel, and forms and pouring concrete. The shaft will not be lined through the salt section but, upon completion of sinking a concrete divider wall for separation of upcast and downcast compartments, will be completed from the 730-ft level to the surface. Since there was no divider wall placed during sinking, a 13-ft 6-in. crosshead was used with the guides on opposite sides of the shaft. The crosshead was



Rubber hose connections on brine pipes allow for contraction and expansion

Solution Channel (about 6 ft by 3 ft) filled with frozen quicksand

made of aluminum to reduce the load on the sinking hoist which was rather small.

Rate of sinking and lining averaged 64 ft per month through the frozen ground. There were no difficulties experienced in sinking.

Method a Success

Frozen quicksand in large solution cavities at 125 ft, as well as ice in fissures and cracks in the limestone, were observed and photographed. From previous experience in No. 4 shaft, it could be concluded that these cavities would have been extremely difficult to sink through by any method other than freezing.

A zone of sandy material, between 310 ft and 350 ft, the lower portion of which was water bearing, gave no trouble, but this same zone had to be cased promptly to prevent caving when churn drills were used for drilling. Several comments in the form of a conclusion may be summarized as follows:

(a) Freezing was a markedly successful method in comparison with other methods tried in the same type of ground. It is the only successful method for combating highly fluid quicksands which cannot be grouted.

(b) Churn drills with cable tools were not successful in drilling straight holes. Rotary tools were faster and drilled reasonably vertical holes. Frequent check surveys must be made during drilling for control. Directional surveys are advisable for a final check to make sure that a wide gap does not exist between any two holes.

(c) Circular cross section is preferable because of its higher strength, especially when ground movement is likely to occur.

(d) One or more holes inside the shaft should be drilled to provide for expansion of freezing water trapped inside the ice ring.

(e) Expensive cast-iron tubbing is not necessarily required. Reinforced concrete lining is cheaper.

(f) Cost of freezing is not excessive and in ground where grouting is difficult due to clays or sands with water, it may be less expensive.

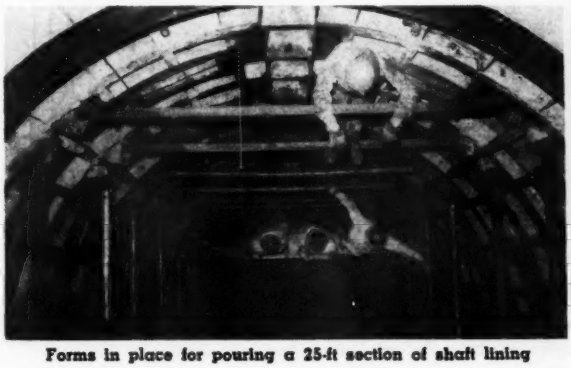
(g) Freezing provides a safe method of going through heavy and wet ground and if concrete lining is kept within 30 ft of the bottom, danger of breaking of the ice wall is limited to the open section. This method appears safer than sinking through all of the frozen section with only a temporary lining, followed by lining with cast-iron tubbing or reinforced concrete from the bottom of the frozen zone to the top.

(h) Where no ground movement is found, it is considered preferable to grout between the partially thawed ground and the concrete ring before complete thawing. This prevents the possibility of lateral movement of large blocks, bringing a high pressure at one point on the circumference of the shaft as well as eliminating a period when full hydrostatic pressure would be exerted on the shaft wall. It is also possible to grout at low pressures, there being no necessity for overcoming the hydrostatic head of the water in the ground.

Acknowledge Aid

Special acknowledgment is made for assistance from G. F. Coope, R. R. Knill, J. Edmunds, L. P. Corbin, and V. H. Montgomery in preparing this paper. Photographs were made by C. L. Krebs. Many valuable suggestions were made by personnel in Winston Bros., the firm which contracted the freezing and sinking of the shaft; Rankin, consulting engineer for Winston Bros.; and officials and engineers employed by Potash Co. of America. Much valuable information was obtained from articles on practice in Europe, where this process originated and where it has been widely and successfully used, often under more difficult conditions.

Appreciation is expressed for information obtained from a number of engineers in England, France, Belgium and Germany.



Forms in place for pouring a 25-ft section of shaft lining

Bearing-set base form holds expansion shields for dowels and upper half of vulcanized water stop

Trackless Mining Systems In Steeply Pitching Coal Seams

Net Savings of 17 and 28 cents Per Ton Come with Changes in Mining Methods and Strict Attention to Details at Two Mines in Wyoming

By JOSEPH Q. BERTA
Research & Planning Engineer
The Union Pacific Coal Co.

AT the present time there are two panel belt mining systems on The Union Pacific Coal Co. property. One is located in the Hanna No. 4-A mine at Hanna, Wyo., and the other is in operation at Stansbury No. 1 mine, Stansbury, Wyo. Because of different conditions, each operation will be described separately.

Hanna Operation

Mining at Hanna 4-A is conducted in a 26-ft coal seam laid down on a monoclinal structure with active workings on a pitch of approximately 10 to 12 deg or an 18 to 22 percent gradient. The coal seam, interbedded between a shale bottom and sandstone top, is friable, high in moisture and subject to spontaneous combustion. The mine is rated gassy by the State Coal Mine Inspection Department.

Mining at the present time employs unbalanced rope haulage on main slopes spaced approximately on 4300-ft centers. The three-entry system is driven to boundary lines with strike entries turned on 1300-ft centers. In the old system, panels were driven to the rise between entries on 750-ft centers with panel rooms, 500 to 600 ft long, driven on the strike line, leaving a 150-ft barrier pillar between each block of panel rooms.

The panel between entries consisted of two places on 60-ft centers driven to the rise with two shaking conveyors equipped with duckbills. This made it necessary to install a development hoist and lay track in one place as the shaking conveyors advanced up the pitch.

Haulage on panels was by panel hoist with track laid in each room and pioneer (first) mining of the rooms was executed with track-mounted cutting machines, hand-held drills and 11 BU loading machines. Coal in each room was extracted in two benches. The top coal was shot down in blocks 100 ft long.

Generally speaking, the old system employed track-mounted equipment: Joy loading machines, four-ton, steel pit-cars and rope and motor haulage.

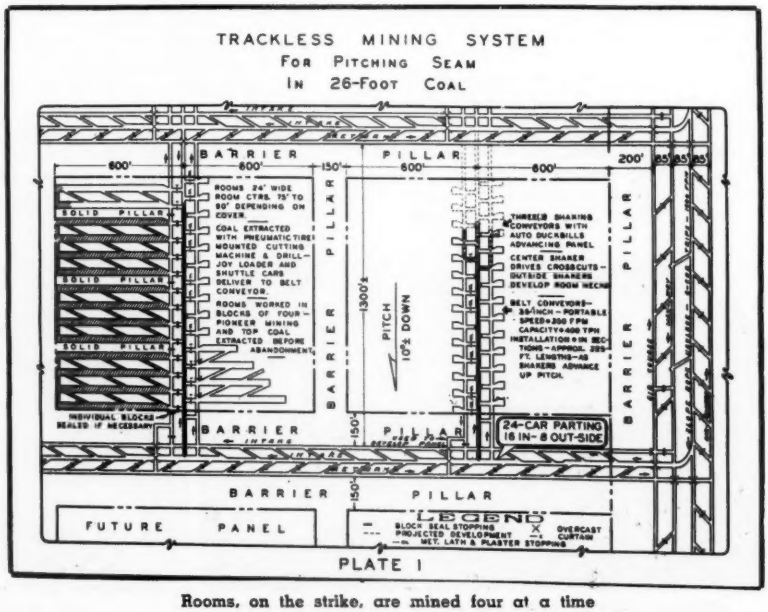
Eliminate Track Sections

Under the present mining system the distance between entries of approximately 1300 ft is maintained and three place panels, on 1300-ft centers, are developed to the rise between entries by use of three shaking conveyors equipped with automatic duckbills. These discharge onto a portable belt conveyor located in the center place. All but the blind crosscuts are driven from the center entry and the room necks are turned from the outside places. A fourth place is driven at the bottom of the panel to establish or furnish positive ventilation during panel development. The height of the 26-ft coal seam is a definite advantage in providing over and undercasts for ventilation purposes.

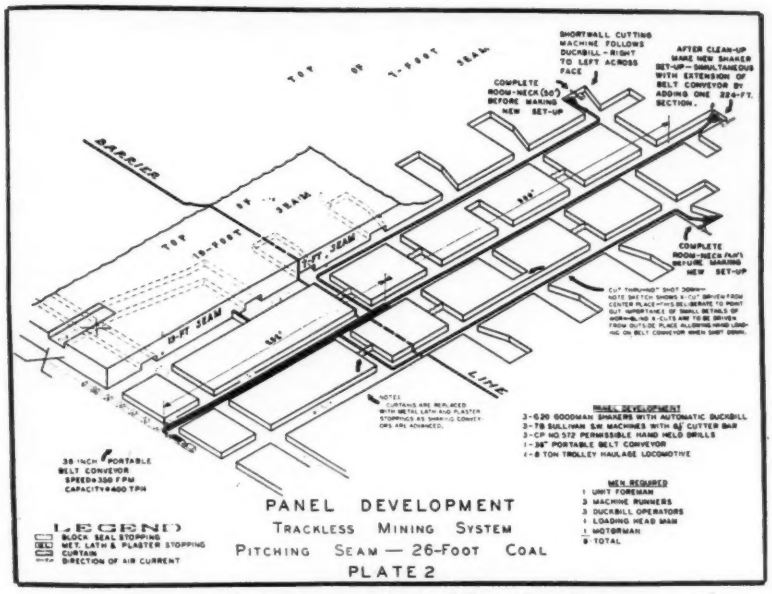
Room necks are staggered on opposite sides of the panel, with room centers at 75 ft. Shaking conveyors are advanced or moved every 225 ft. An addition of 225 ft of portable belt conveyor is made with each shaking conveyor move.

Experience has taught that the small details of mine work are the important ones. A mistake in procedure is deliberately shown on Plate No. 2 to emphasize this point. Here the blind crosscuts which are cut through and not shot down are shown driven with the shaking conveyor of the center place. When the coal is shot this would necessitate double or triple handling of the broken material before it reaches the belt conveyor. The obvious and proper method is to develop the blind crosscuts with the outside shakers, leaving the fall to be shot down adjacent to the belt conveyor in the center place for loading ease.

This method of panel development eliminates all track work on the panel. It also does away with the development hoist at the lower end of the panel, together with the services of the hoisting engineer and rope rider who service the shaking conveyors as they are advanced up the pitch. The belt conveyor replaces the development hoist



Rooms, on the strike, are mined four at a time



Panels are developed with automatic duckbills and shaking conveyors

and track. One loading-head man executes the work formerly performed by the hoisting engineer and rope rider. This facility also improves pit-car service to the shaking conveyors and eliminates, to a great extent, delays awaiting car service.

Work Must be Balanced

It is necessary to plan the number of panel crosscuts and room necks to be developed by each shaking conveyor in order that a proper balance of work is provided for each unit to keep the shaking conveyors in step in advancing the panel.

Shaking conveyor units are removed through the top entry and trackless mining equipment installed to drive the first block of four rooms on the lower and inby side of the panel. Upon completion of the panel development, the belt conveyor is completely installed, ventilation established to the return aircourse above, and the panel made ready for pioneer room mining.

Pioneer room mining in the 26-ft seam is accomplished by use of a 10 RU pneumatic-mounted cutting machine with places driven 24 ft wide, center cut 10 ft above the floor and center sheared. Drilling is done by a CD-25 rubber-tire mounted drill. Coal is loaded by an 11 BU loader into two, 60E 10-ton shuttle cars and then trammed to an elevating conveyor which discharges onto a 36-in. belt conveyor.

Slant crosscuts are driven between rooms on a gradient of nine to 12 percent in favor of loaded shuttle cars. Two elevating conveyors are employed, providing two points of loading onto the belt for each block of four rooms.

During pioneer room mining, ventilation is conducted to the working faces by use of line brattice from the last open crosscut, with return air from the last room to the rise coursing through the panel to the return aircourse above. Needless to say, it is important to maintain a positive method of ventilation in a potentially gassy mine.

Top Coal Cut and Drilled

Major problems in top coal extraction in the Hanna field are roof control, the preparation of "lips" and top coal drilling. These were met in the past by employing hand-held drills for drilling and made necessary excessive pick work to trim top coal "lips" properly. Thus labor was an item of major expense in top coal mining. After the first bench of top coal was broken, the drilling was done from the top of the coal piles with hand-held drills.

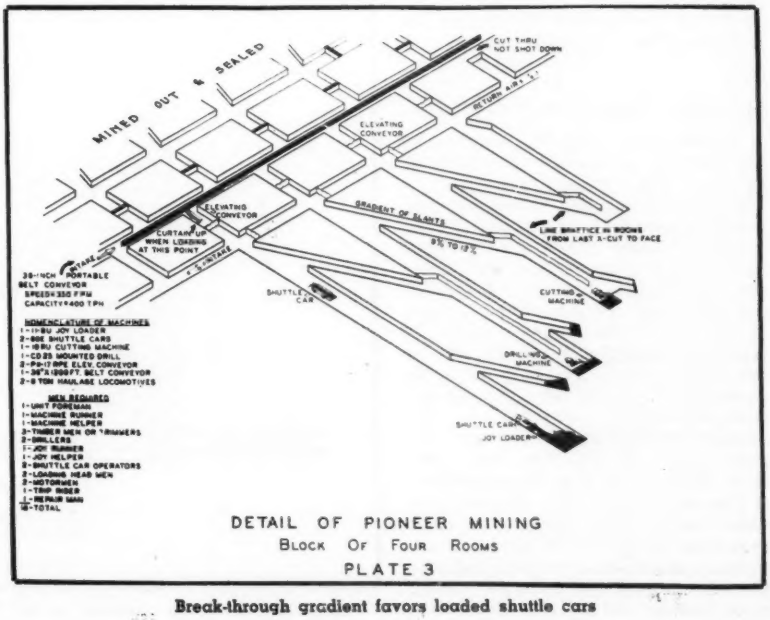
The present method of top coal extraction provides for the usual sacrifice of four ft of top coal. The "lips" are prepared by application of a vertical and slant cut with the 10 RU machine. "Lip" cuts are made before the machine is removed from the room.

Slant holes, on four-ft centers in each direction, are drilled with the CD-25 mounted drill. In loading the top coal holes it is standard practice to load the back or top end of the hole with three sticks of permissible powder, stem these, then load three more sticks and stem the lower or front end of the hole. Loading of holes is best accomplished through the use of a trough. There are two detonators per hole with five holes across the room. This allows the use of a permissible ten-shot battery. Placing of the powder thus, and shooting to an open end makes possible good preparation and elimination of the large chunks usually found in top coal shooting. Use of belt-conveyor haulage makes it necessary to avoid any large chunks.

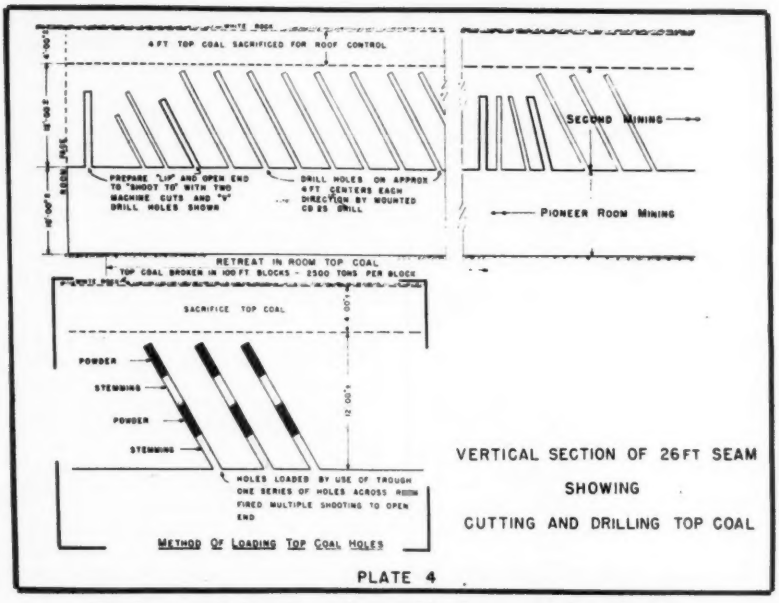
2500-Ton Coal Falls

Top coal is cut, drilled and shot down in blocks 100 ft long, furnishing approximately 2500 tons per fall for continuous loading.

It is important to understand the proposed sequence of top coal extraction in rooms and room slant crosscuts. Top coal in the room proper is extracted back to within 20 ft of the



Break-through gradient favors loaded shuttle cars



"Lips" are cut before the cutting machine is removed from the room

lower rib of the slant crosscut above, leaving a bridge of top coal to support the narrow pillar at this point. The top coal is then pulled back in the slant crosscut to the high rib of the room and another block of top coal extracted in the room proper. All top coal is removed from the block of four rooms before abandoning them. This allows the sealing of individual blocks of four rooms if it becomes necessary. Solid pillars are left between each block of four rooms to facilitate sealing.

Proper organization and maintenance of mining cycle at the working face, as always, is the most important phase of mining and determines the success or failure of this mine operation.

Develop Panel in 200 Shifts

A continuous cycle of operation is provided for in the panel development system. The cutting machine is sumped in the corner of the working place as soon as it is cleaned up and follows loading across the working face, with drilling, loading and shooting following in sequence. Nine men are employed in each section, which is made up of three loading units. It takes 200 machine shifts to develop the panel proper, including 45 shifts provided for moving shaking conveyors and installing belt conveyor. The average tonnage is 67 tons per machine shift or 200 tons per shift from the panel development operation.

Continuous operation is also provided for in room work. The labor personnel required, 18 men, is adequate to maintain a complete and continuous cycle of operation in pioneer room mining and top coal extraction. The three men indicated as timberman or trimmer, together with the electrical and mechanical repairmen execute dead work, i.e., necessary timbering, extension of line curtains, trimming of "lips" and ribs, etc. Production from pioneer room mining, an average of seven places per shift, is 500 tons per shift. Production from top coal mining is 800 tons per shift.

Conclusions

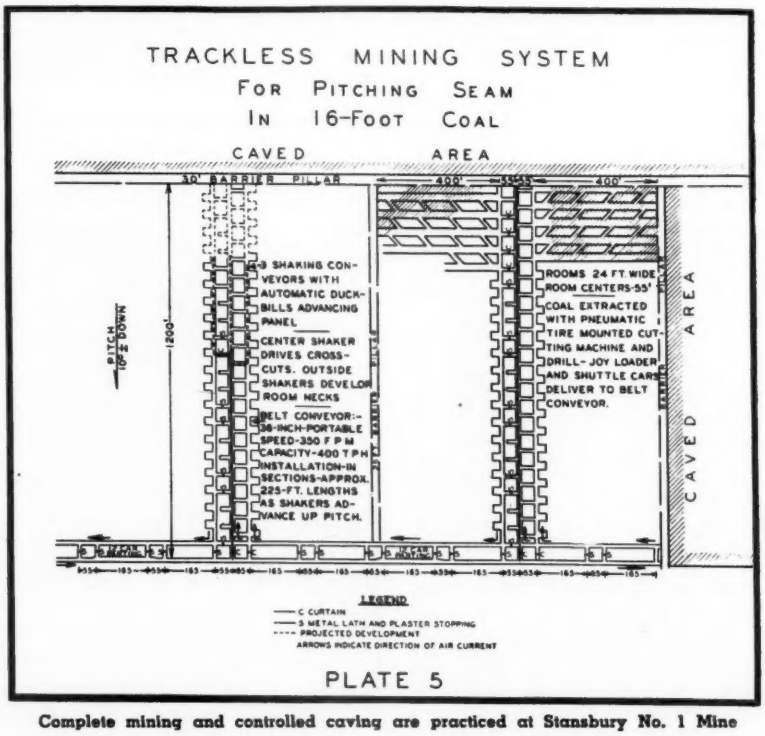
The principal advantages of trackless mining system applied to the foregoing particular condition are:

(1) Elimination of track in panel and rooms
(2) Elimination of panel development hoist
(3) Elimination of panel hoist installation
(4) Savings in power consumption effected by use of a 40-hp belt conveyor in lieu of a 200-hp panel hoist
(5) Labor savings due to more efficient operation

These major items of advantage have resulted in a savings, for the 480,000 tons removed from each panel, of 21 cents per ton. Capital outlay for equipment is approximately $150,000, bringing about an additional depreciation charge per ton based on a 15-year period and 200 working days per year in the amount of four cents per ton. This makes a net saving of 17 cents per ton resulting from the present system as compared to the old.

Stansbury Operation

Mining at Stansbury No. 1 mine is conducted in 16-ft coal seam laid down on an anticline structure with the axis eroded away, leaving the active working on a pitch approximately 12 deg or a 22 percent gradient. The coal seam is interbedded with a sand-



Complete mining and controlled caving are practiced at Stansbury No. 1 Mine

stone bottom and shale top. This coal is friable, contains less moisture than does that at Hanna and is also subject to spontaneous combustion. Gas has never been found in the Rock Springs area, and the mine is rated non-gassy.

Mining is done with unbalanced hoists on the main slopes which are spaced 3500 ft apart, but a conventional two entry system on 330-ft centers was used. These strike entries, 12 ft wide on 55-ft centers, were driven to the boundary line. Retreat was started from the boundary by driving rooms up the pitch a distance of 330 ft and extracting the inside pillar on retreat by pocketing and stumping.

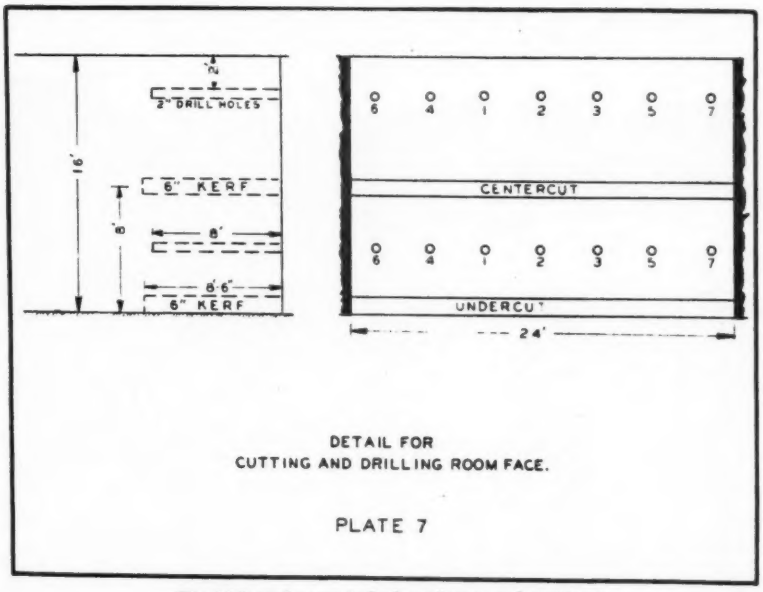
Haulage was by eight-ton locomotives pulling trips of eight, four-ton cars. Mining in the entries and rooms was accomplished by shortwall mining machines, hand-held electric drills, and shaking conveyors with duckbills.

Change to Trackless Mining

In the new system, entries are driven on 1200-ft instead of 330-ft centers. Three place panels are developed 1200 ft to the rise on 900-ft centers. Shaking conveyors discharge onto a portable belt conveyor similar to the method at Hanna.

This system of panel development eliminates track and trolley work in three entries with the corresponding amount of strike development or narrow work and necessary ventilating door or overcasts for ventilation of these entries.

Strike rooms are driven 24 ft wide and 400 ft long on 55-ft centers. Since complete mining and controlled caving are practiced at Stansbury, room and pillar work must be started at the top and inside of each panel. Caving is controlled and kept adjacent to the active mining to relieve pressure on the pillars which are mined from the bottom side.



The 16-ft coal seam is both undercut and centercut

Shaking conveyor units, used to develop the panel, are temporarily pulled to one side after panel development is complete and the trackless mining equipment installed to drive the first block of four strike rooms on the top, inby side of the panel. After room and pillar coal extraction is completed on both sides of the top end of the panel, shakers are installed to mine the top coal in the panel, panel pillars and the last pillar in each room. This must be done as soon as possible as a squeeze comes on the panel when coal is removed from both sides.

Details are Important

A mistake in procedure is shown on Plate 5 to point out how important small details are. Here the last cut in a blind crosscut should be left adjacent to the belt conveyor in the center place for ease of loading after it is shot down.

A fifth room is driven with each block of four rooms. This is done to assure an ample number of faces, especially when pillar mining is nearing completion in the four rooms. It also assists in the staggering of mining in the succeeding rooms. The fifth room generally is only partially developed before the mining in the four rooms above is completed.

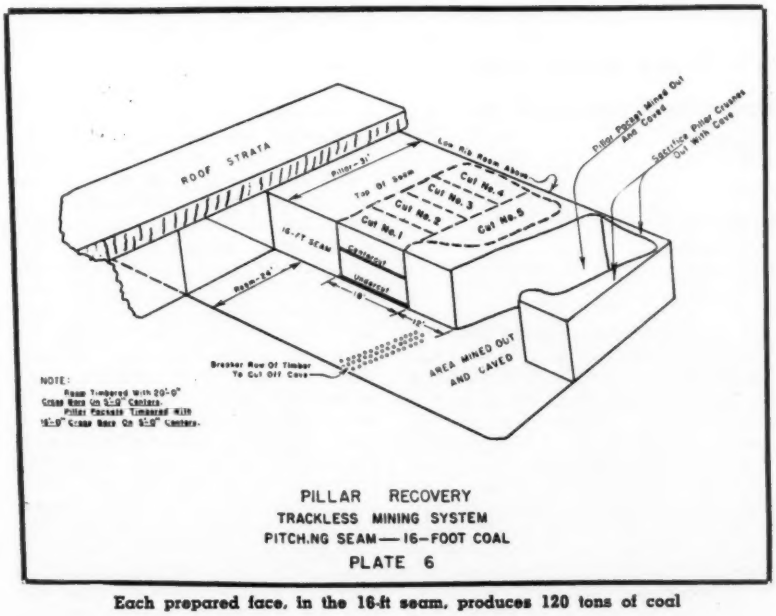
Room and pillar mining is accomplished by a 70 RU pneumatic-mounted cutting machine, CD-25 rubber-tire mounted drill, rubber-tire mounted timbering machine designed on the properties, 14 BU loading machine and two 10 SC seven-ton shuttle cars tramming to elevating conveyors which discharge onto a 36-in. belt conveyor.

Slant crosscuts are driven between rooms on a gradient of approximately 11 percent in favor of the loaded shuttle cars. The two elevating conveyors provide two points of loading onto the belt for each group of four rooms.

Ventilate with Blowers

Ventilation into the working faces is by blower fans located in the fresh air brought up the two inby places of the panel. Return air travels down the outby place and out the top entry. A solid barrier pillar can be left be-

(*Continued on page* 70)



Each prepared face, in the 16-ft seam, produces 120 tons of coal

Trucks shuttle between shovel and pit screening plant which feeds belt conveyor

Heavy Duty Trucks on the Mesabi Range

Continued Improvements in Truck Design and Performance Extend Horizons in Open Pit Iron Mining

By R. W. WHITNEY
General Manager of Minnesota Mines
The M. A. Hanna Co.

PRIOR to 1937, all surface and rock stripping and ore haulage in the open pits on the Mesabi Range was done with locomotives and cars. In order to continue operation of active mines and to exploit properties held in reserve, which in most cases were small and deep, it became necessary to devise a new system of transportation. In 1937 the first heavy-duty off-highway truck made its appearance on the Mesabi. Since that time, the trend has been away from rail haulage. During 1950, it is estimated that 80,000,000 cu yd of stripping were moved on the Minnesota Ranges. Of this total, trucks handled 65,000,000 cu yd or 84 percent. During the same year 61,000,000 tons of iron ore were shipped from open pit mines of Minnesota. Trucks handled 39,000,000 tons or 64 percent of the total tonnage. These figures emphasize the swing from rail to truck haulage in the last 14 years. It is believed this trend will continue in 1951 and for many years to come.

The number of heavy-duty trucks in service on the Minnesota Ranges has grown from zero in 1937 to 1200 in 1951. M. A. Hanna Co. operates about 17 percent of these trucks.

The first heavy-duty off-highway trucks were of 15 long-ton capacity with a 10-cu-yd box and were powered by 150-hp diesel engines.

Throughout the years since these first heavy-duty trucks were introduced many experimental models have been built and tested. These experiments have brought about many improvements and also new models.

In 1938 superchargers were added to the engines, giving these trucks 200 hp. In the early 1940's, 30-ton capacity tandem-axled trucks were tried by one mining company. These trucks were powered with only a 200-hp engine and because of their reduced speed did not become popular with the mining companies. With the exception of operating and design improvement, no major changes were made until 1944, when 20-ton capacity trucks appeared and soon were used extensively in mining operations. These trucks had 14-cu yd boxes and were powered by 275-hp diesel engines.

The next major change occurred in 1948. A fleet of 30-ton trucks was put into service at Hanna's Douglas

Mine at Chisholm. The dump box had a capacity of 24 cu yd. This truck was powered by two diesel engines of 190 hp each.

Over the years, loading equipment for these trucks has varied from 2½- to 7½-cu yd dippers. The 15-ton truck was usually loaded with shovels up to the 120-B class, using a 4½-cu yd dipper. The shovel runner operating a shovel with a 4½-cu yd dipper had some difficulty in placing all his load in the small box of the 15-ton truck. This situation was corrected with the adoption of the 20-ton truck and its larger box. Eventually, the 6- to 7-cu yd dipper of the 170-B class shovel became popular for loading. Again the problem of truck loading with the larger dipper became serious. With the coming of the 30-ton truck and its 24-cu yd box, the difficulty has been reduced. It appears likely that before long Hanna will be using 8- to 10-cu yd shovels. This may again necessitate the increase in truck box size. At the present time experiments are being conducted with a 45-ton 32-cu yd capacity truck which is powered by two 300-hp diesel engines. The mechanical setup is the same as the 30-ton trucks which will be described later.

While the end dump is the most commonly used truck on the Minnesota Ranges, bottom and side dumps have been used and some are still in use. Most of the truck engines use diesel fuel oil. However, there are a few trucks that use butane as fuel.

Trucks for Shuttle Haulage

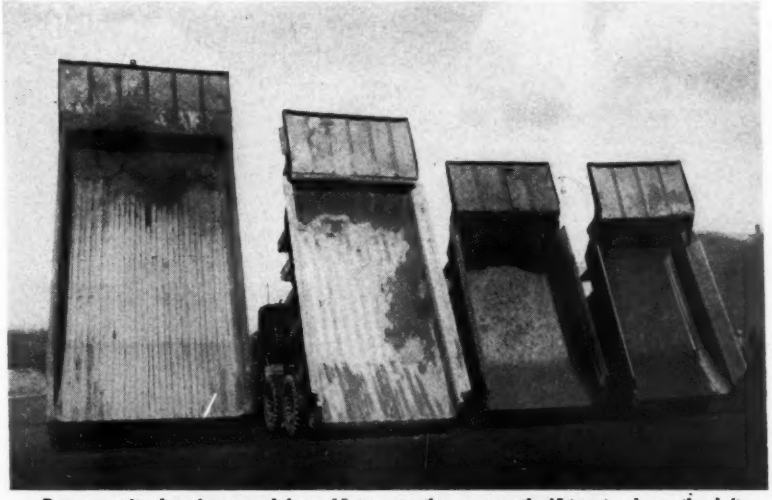
When 15-ton trucks were first introduced to the mining industry, they were used as a transporting unit between the shovel and the ore cars or the waste dumps. As truck haulage became more popular, particularly in the wash ore mines, the trucks were used for shuttle haulage between shovel and a gathering point such as pit screening plant or skip pockets. After the loads are dumped into the screening plants, the ore is then carried to the washing plant by belts. This eliminates truck haul up long and adverse grades. Of course, during the stripping season, the trucks haul material from the shovels to the disposal areas.

As many previous papers have been written on the performance of the 15- and 20-ton trucks, this paper will be confined to the description and usage of 30-ton trucks. The 30-ton truck, highest in popularity and usage, is a tandem-axled 4 by 6 using 16.00 by 24.00 tires, and manufactured by Euclid Road Machinery Co.

30 TON TRUCK COSTS
PER HOUR

	OPERATING CONDITIONS		
	POOR	AVERAGE	GOOD
LABOR			
TRUCKDRIVERS	2.323	1.814	1.757
SHOP REPAIR LABOR	1.652	1.324	0.835
TOTAL LABOR	3.975	3.138	2.592
SUPPLIES			
FUEL OIL	1.396	1.018	0.991
LUB OIL	0.452	0.333	0.278
MISC. GREASE	0.079	0.055	0.044
ENGINE PARTS	0.933	0.715	0.423
TRUCK PARTS	1.779	1.176	0.729
TIRES & TUBES	4.731	1.976	0.898
BATTERIES	0.062	0.059	0.058
MISC SUPPLIES	0.584	0.495	0.382
TOTAL SUPPLIES	10.016	5.827	3.743
TOTALS—LABOR & SUPPLIES	13.991	8.965	6.335

Operating conditions seriously affect costs



Box capacity has increased from 15 tons to the mammoth 45-ton truck on the left

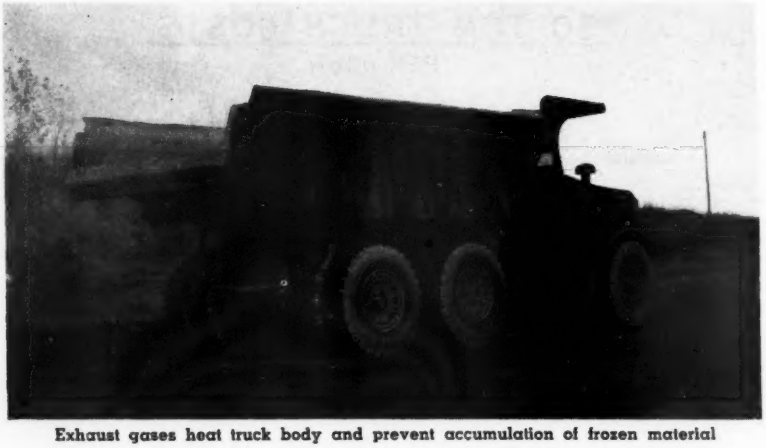
Use Torque Converter

To get the 380 hp these 30-ton vehicles require for efficient operation, two engines are used. There are also 30-ton trucks using a single 400-hp engine. The engines are connected directly to torque converters. These torque converters are single-stage units with a multiplication capacity of about 3 to 1. The torque converters are connected through a short driveline to two transmissions of the semi-automatic type which are operated by hydraulically controlled friction clutches. By means of these transmissions each engine drives one of the rear axles. These twin transmissions are controlled simultaneously by a single lever which is mounted in the cab next to the driver's right hand. There is no clutch, so shifts can be made at any time regardless of truck or engine speeds. Every truck is equipped with hydraulic steering with the hydraulic pressure being furnished by a pump driven by one of the engines.

Availability of the 30-ton trucks has been very good; averaging consistently over 100 hr per truck a week. This is about 20 percent better than experienced with the 20-ton trucks.

Big Trucks Faster

It costs about 16 percent more to operate the 30-ton truck than the 20, but the former has 50 percent more carrying capacity. Coupled with this



Exhaust gases heat truck body and prevent accumulation of frozen material

increased capacity is the fact that the 30-ton truck can outperform the 20-ton truck in most applications. On an 8 percent grade with a rated load, the 30-ton truck will travel 8 to 10 mph depending on road conditions. On the level, it will attain speeds of about 30 mph. On the empty return trip, these trucks will travel up to 35 mph. This high speed on the level and on return trips is much greater than the 20-ton unit for two reasons: first, there is more power available in the 30-ton unit; second, the riding qualities of the larger unit are much superior to the single-axled truck. This superior riding quality, of course, encourages the driver to utilize his top speed.

Costs Analyzed

During the first six months of 1951, operating cost for these 30-ton units has been about $8.70 per operating hr. During the same period, the 20-ton trucks cost about $7.50 per hr. Operating hours are the hours the truck is actually working, and do not include down time, change of shift, lunch time, or service time. Truck costs are divided into two categories: labor and supply. Labor includes driver costs and shop repair labor cost, including mechanics, welders, machinists, electricians, etc. Supply cost includes fuel oil, lubricating oils, hydraulic oils, greases, engine parts, truck parts, tires and tubes and their repair costs, batteries, cooling fluid if any antifreeze is used, and miscellaneous supplies such as waste, rags, filters, etc.

Operating costs are high where there are considerable amounts of rock handled and where wet conditions prevail throughout the pit. Not only is the tire cost increased considerably, but the rest of the vehicle from the engine to the rear axles suffer from high torque loading necessary for the heavy going through a mixture of water, mud and rock.

Constantly Patrol Roads

General operating practice is to design pits on 8 percent grades. This grade lends itself fairly well to most pit operations and is not so steep that the problem of tire creepage and slippage becomes serious. To keep haulage roads smooth, most mining companies have road patrols continually reworking road surfaces. Dust caused by the heavy trucks creates a situation which from a safety and mechanical viewpoint must be controlled at all times. The usual procedure for controlling dust has been the use of sprinkler wagons. A few attempts have been made at hard surfacing, concrete paving, and road oiling. None has proved to be the answer to the dust problem, although hard surface and concrete roads do eliminate some of the need for road maintenance.

Regular Overhauls Scheduled

Most companies are using a preventative maintenance program to lower their truck operating cost. At Hanna periodic checks of engines and chassis are made to keep the trucks in as good condition as possible at all times. Engines receive a complete check every 3000 hr and the chassis is checked monthly. The engine and the other major units of the truck are overhauled every 6000 hr. It has been found that through a preventative maintenance schedule, truck costs can be lowered and availability increased. All major units, engines, transmissions, differentials, converters, etc., are repaired in one central repair shop. This shop overhauls about 170 engines and auxiliaries per year. Trucks are serviced once every 24 hr. It is felt that for high availability, trucks must be checked daily for adjustments, loose connections, fittings, etc. This checking is as important as greasing. One man serves as a tire inspector. He inspects tires both on the truck and those in process of repair and makes a weekly check and reports condition of all roads to the management.

Systematic Tire Repair

All trucks are equipped with rock removers for dual tires. They prevent rocks from lodging between the duals and fretting their way through the carcass sidewalls. Previously, rocks were removed by the use of sledge hammers and bars. This labor has been completely eliminated and sidewall abrasion from rocks lodged between the duals is no longer a problem.

Eight percent is controlling grade in pit road design

A skiving program has been adopted to prevent tire cuts from holding rocks which eventually work themselves into the carcass; this, of course, will cause ultimate failure. A central tire repair shop is maintained to make sectional tire repairs on about 95 tires per month and repair about 275 tubes during the same period.

All trucks are equipped with fire extinguishers located for convenient access by the driver in case of fire. Occasionally, fires are caused by electrical shorts or fuel or lube oil leaks on hot exhaust manifolds. Each year the cost of fire extinguishers has been justified.

Drivers Are Trained

In addition to the preventative maintenance program, truck drivers are guided by a set of rules which prescribe both proper mechanical care and points of safety. A set of rules is furnished each driver for his own personal use and one set of rules is placed in a conspicuous spot inside the truck cab. New drivers are given at least three days of instruction. The first day is spent in the truck repair shop with the truck foreman, who explains and shows the results of improper truck handling. He also explains the truck rules to the new driver. The second and third days are spent in actual driving of the vehicle. An older, competent driver is chosen to break the new man in on the different types of trucks. This teacher shows the new man the proper ways to handle each type of equipment. At the end of the third day, the truck foreman checks the methods and the ability of the new driver. If all the instructions have been absorbed satisfactorily, the man is allowed to take his assigned place in the working force.

Heat Truck Boxes

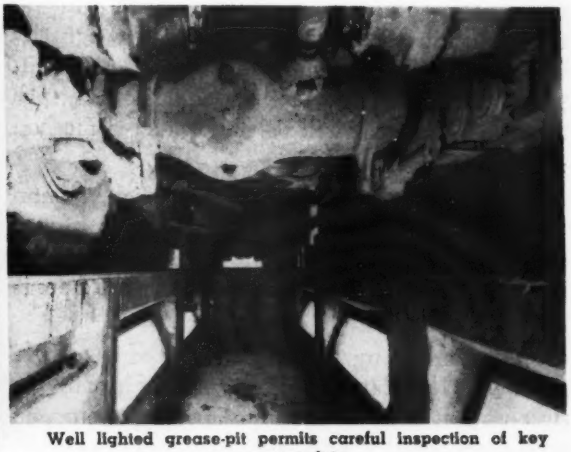
In northern Minnesota the average mean temperature for five months of the year are considerably below freezing, with a maximum of 35 to 40 deg F below zero. Freezing weather creates a serious operating problem because the material handled freezes to the bottom and sides of the truck box. To overcome this situation, salt, chloride and fuel oil were originally used to create a film between the truck bottom and the material. However, these substances wore off readily, and there was still considerable freezing of material to the truck box. This necessitated hand scraping and pounding of the box by the driver and use of extra labor with a considerable loss in truck operating time. For a short time a mechanical hydraulically operated scraper known as the Gradall was used for this purpose. This scraper increased truck availability considerably, but there was still some time lost each shift. Then experiments were begun in heating the boxes with the exhaust gases and a successful method devised. By 1949 exhaust-heated boxes became universally accepted throughout the northern ranges as the best method to prevent accumulation of frozen stripping materials in the truck boxes during freezing weather. These truck boxes are so constructed that the exhaust of the engines passes between the outer wrapper sheet of the box and the inside liner plate, thus keeping the liner plate above the freezing point.

Truck Haulage Flexible

To summarize, over the years many technical advances have been made in both the technique of truck haulage and the mechanical workings of the trucks. As a result of these changes, load-carrying capacities have been greatly increased and the availability of the vehicle for work has increased to a point that the operator can predict with confidence the number of vehicles he can maintain on the line at all times. Many marginal properties that are small, narrow and deep are being worked with trucks that could never have been worked at a profit with rail haulage. When opening up a new property, the truck and shovel combination can usually make ore available much sooner than rail haul, because this combination can work in a relatively small area. Once the property is opened up, it is usually found that there are different grades of material in the orebody. In order to meet the demands of the grading department and the ore sales department, different products must be shipped, and shovels must be moved from area to area within the pits. Truck haulage fits in ideally with such flexible operating requirements.

Generally, in the over-all picture, operational costs have been reduced by the use of these larger high-powered off-highway trucks. Because of the evolution in truck size and design, shovel and truck operating costs, on a yardage basis, have been maintained close to the early 1940 levels. Through the use of truck haulage, many properties have been opened up that were heretofore economically unfeasible. If truck efficiency increases at the same relative rate that it has in the past 14 years, many properties now considered unworkable will be producing ore at a profit.

Tires are fixed in central tire repair shop



Well lighted grease-pit permits careful inspection of key wear-points

New Method of Artificial Respiration Adopted by Bureau of Mines

AN IMPROVED method of artificial respiration, known as the Nielsen or back-pressure arm-lift, has been adopted by the United States Bureau of Mines, the American Red Cross, the armed services, and other agencies and organizations. It will soon be included in first-aid courses given by Bureau of Mines instructors to miners and others in the minerals industries. Called improved because of the greater amount of air exchanged in the lungs, the new method will not replace present resuscitation methods taught by the Bureau of Mines and used in First Aid competition, but will be used in conjunction with them. However, it will be the preferred method wherever possible.

Developed by a Dane—Holger Nielsen—and used in Norway, Denmark and other European countries for many years, the method can be administered without undue fatigue to the operator.

Research leading to the adoption of the Nielsen method predates World War II, when investigators first doubted the superiority of the prone pressure method. The armed forces became interested in this project in connection with the possibility of poison gas or nerve gas warfare. About two years ago the Army Chemical Corps assigned four research teams to study comparative values of various artificial respiration methods.

Results of the research showed that the prone pressure method was less effective in the amount of air exchanged. It compresses the chest but does not actively expand it. In the two-phase methods—back-pressure arm-lift—the hip-lift and the Silvester—the chest is actively compressed and expanded by the rescuer. Tests reveal that in the new method about a quart of air is exchanged in the victim's lungs, while in the Schaefer (prone) method only about a pint of air is exchanged.

Recommended because it does not tire the rescuer unduly, the Nielsen method can be performed by a small person on a heavy victim and is relatively easy to teach.

New Method Described

To apply the new method of artificial respiration, the victim is placed face down in a prone position with arms overhead and bent at the elbows, one hand upon the other, and the head turned to one side so that the cheek rests on the hands. After removing any foreign objects from the mouth, and seeing that the tongue is forward, the rescuer, on one or both knees at the victim's head, places his hands on the victim's back, with thumbs just touching and the heels of the hands just below an imaginary line between the victim's armpits. Rocking slowly forward, elbows straight, until his arms are almost vertical, the rescuer exerts steady pressure on the back. Next, he rocks slowly backward and slides his hands out along the victim's arms to a point just above the elbows, which are then raised until resistance is felt at the victim's shoulders. The arms are dropped to their original position to complete the cycle, which is repeated 12 times a minute.

As can be seen, it would not be possible to use this method on a man with a broken arm or a broken back and the position of the rescuer makes work on any head injuries the victim might have almost impossible. Therefore, the Schaefer prone and Silvester methods will continue to be taught by the Bureau of Mines and through their use lives will be saved in the future as they have in the past. However, since the back-pressure arm-lift system does get more air into and out of the lungs, its use will be preferred wherever possible.

Manuals describing in detail the Nielsen method are now being prepared by the Bureau, and will be distributed to the Bureau's first-aid instructors when completed.

Reprints of this article may be obtained from the MINING CONGRESS JOURNAL.

Nielsen Method allows the interchange of 100 percent more air than does the time-tested Schaefer prone method.

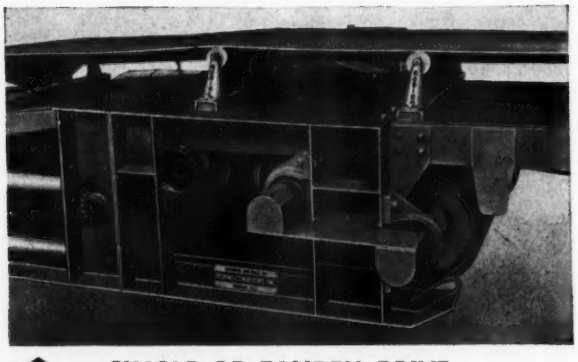
1. After the rescuer gets into position, kneeling on one or both knees at the victim's head, he places his hands on the victim's back so that the thumbs just touch and the heels of the hands are just below a line running between the armpits

2. He then rocks forward slowly, keeping the elbows straight, until his arms are approximately vertical, exerting steady pressure upon the chest

3. Then he rocks backward, slowly sliding his hands to the victim's arms just above the elbows

4. Continuing to rock backward, he raises the arms until resistance and tension are felt at the victim's shoulder. He then drops the arms and thus completes a full cycle. Cycles are repeated 12 times per minute, the expansion and compression phases being of equal length, and the release periods of minimum duration

ROOM.... GATHERING.... OR SLOPE



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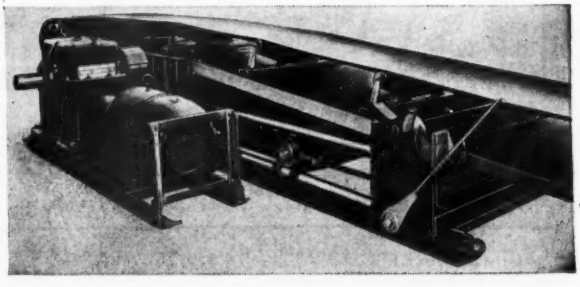
Hewitt-Robins Mine Conveyors come equipped with both single and tandem pulley drive elements. Provide ample horsepower for lift and length up to the very limits of belt capacity. Reeving of belt handles level, uphill or downhill service requirements.

UNIFIED DRIVE SECTION

Motor, reducer and controls mounted on a single base—skid-designed for easy moving about. Can be located on either side of the conveyor. Drive reversible—incoming for men and material, outgoing for high output of product.



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Solve your underground conveying problems the easy, economical way. With a choice of THREE types of Hewitt-Robins Mine Conveyors, you are sure to get exactly the equipment you want.

TYPE I has *internal* drive for level or *up*hill operation; in 26", 30", 36" and 42" widths—lengths to 3000 feet or more.

TYPE IS has *internal* drive for level or *down*hill operation; in 26" and 30" widths—lengths to 3000 feet or more.

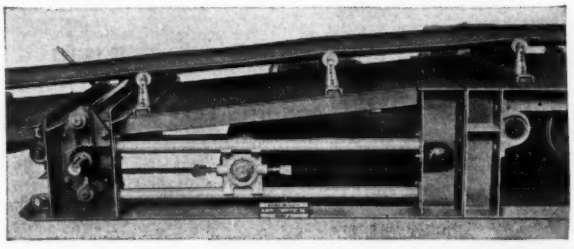
TYPE H has *head* drive for level or *up*hill operation; in 26" and 30" widths—lengths to 2000 feet.

Intermediate Sections are standard, fit all three types. Assembly is easy—both ends are identical, need no "matching up." Made in 8' and 10' rigid and demountable sections. Also available are Intermediate Channel Sections in 12' lengths—30", 36" and 42" widths.

Only Hewitt-Robins can offer you a complete mine conveyor "package"—machinery *plus* belt, motor, reducer and drive! You can order equipment to fit your needs to a "T"—single or tandem pulley drive . . . internal or tail takeup . . . the famous Ajax® heavy-duty belt, in the required length and width.

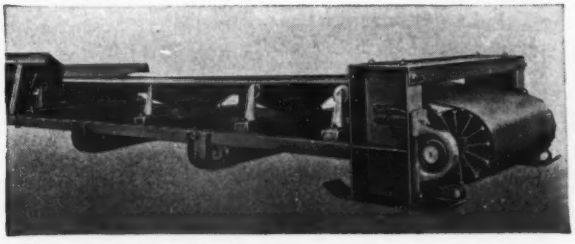
The sturdy machinery is built for the toughest kind of service. You get ball or roller bearing, one-shot lubrication idlers . . . lagged pulleys for maximum power transmission . . . a conveyor backed by over half a century of engineering and manufacturing experience. And, only Hewitt-Robins leaves you worry-free—takes complete *unified* responsibility for successful performance of machinery *and belt!*

Make sure you get the best for your money. Write for detailed specifications. Address: Hewitt-Robins Incorporated, 1010 Pennsylvania Ave., Charleston, W. Va., or 270 Passaic Ave., Passaic, N. J.



INTERNAL TAKEUP

Located directly back of the drive. Handles 10' of belt slack. Operated by reversible ratchet-wrench working on gear reduction to minimize manual effort. Arranged so an automatic counterweighted gravity take-up can be added if desired—eliminating manual adjustment. Double-acting pawl prevents back-up.



TAIL SECTION

Telescopic type to provide tail takeup action. Easy to clean out—no steel work under tail pulley. Has transverse cover to protect pulley, bearings and belt. Strong enough so that you can rest a feeder on it.

FOR A COMPLETE EXPLORATION of belt conveyor mining from face to tipple write for Bulletin 153.

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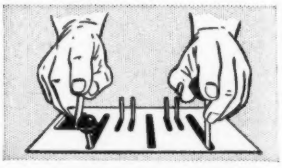
up to 25% more production

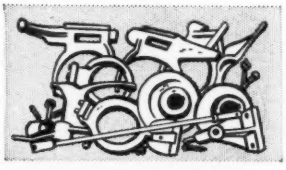
LINK-BELT SPEEDER with *Speed-o-Matic* controls

Millions of yards to move—and still the operator gets a break! Effortless Speed-o-Matic Controls on this K-370 step up big yardage on stripping jobs—makes it easier on operator, more profitable for owner.

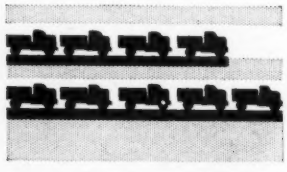
Speed-o-Matic full hydraulic controls mean stepped-up production



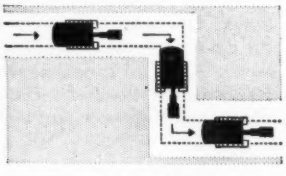
Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.



Eliminates up to 150 parts — cuts friction, no worn bushings, pins, links or clutch toggles to put you "down."



Up to 25% more production — fast operating cycle steps up output and profits. Effortless control keeps operator fatigue down.



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CEDAR RAPIDS, IOWA

Annual Members Meeting

Charles E. Wilson Addresses Record Attendance Informally at New York Gathering

WHEN the American Mining Congress convened in New York on Tuesday evening, December 4, for its 53rd Annual Business Meeting, there were more members present than at any previous such gathering. The social hour before dinner provided an opportunity for those present to compare notes with fellow members and to rub elbows with the distinguished guests, who included numerous men prominent in mining and in the affairs of the nation.

Following dinner the meeting was called to order by President Howard I. Young. He presented Mr. Charles E. Wilson, Director of the Office of Defense Mobilization, the guest speaker of the evening, who received a rising ovation. Mr. Wilson delivered an inspiring, off-the-record address. In it he called for the exercise of patriotic restraint on the part of all Americans, and voiced the belief that through unity and restraint we can achieve the goal toward which we are striving—Peace. Upon the conclusion of his remarks, Mr. Wilson was again accorded a rising ovation, as a token of the respect in which the mining industry holds him and a pledge of full cooperation in the effort to make this nation strong militarily and at the same time increase its economic strength.

AMC Secretary Julian D. Conover submitted an informal report covering the work of the Mining Congress in the past year, and outlining some of the matters that will call for the industry's attention in 1952. In concluding, he paid tribute to Donald A. Callahan, Director and Vice-President of the Mining Congress for the past 18 years, who had passed away in Los Angeles on October 26, 1951. Following this, the President asked all present to rise for a moment of silence in respect to Mr. Callahan's memory.

The chairman of the Finance Committee, Andrew Fletcher, presented his report, showing the American Mining Congress to be in strong financial condition. Mr. Young expressed warm appreciation for the fine work and loyal support of all the committees—though in the interest of brevity he did not call for reports from the Chairmen of the Tax Committee, the Gold Producers Committee, the Land Use Committee or the Social Security Committee.

Mr. Young then asked a number of guests to rise and be recognized. Among those he introduced were men presently engaged in Government activities of great importance to mining, including the Honorable Robert R. Rose, Assistant Secretary of the Interior; William E. Wrather, Director, U. S. Geological Survey; John J. Forbes, Director, U. S. Bureau of

(*Continued on page* 73)

Elton Hoyt, Senior Partner, Pickands Mather & Co., Cornelius Kelley, Chairman of the Board, Anaconda Copper Mining Co., AMC President Howard I. Young, and Louis S. Cates, Chairman of the Board, Phelps Dodge Corp., listen intently as Charles E. Wilson, Director, Office of Defense Mobilization, speaks to the members

The Coal Division Luncheon was a well-attended feature of the Conference

Coal Division Holds Annual Conference in Pittsburgh

Committees Present Reports on Latest Developments In Equipment and Operating Practices

ON November 15, the Coal Division of the American Mining Congress met in Pittsburgh, Pa., for its 17th Annual Conference. Prime purpose of the meeting, held in the William Penn Hotel, was to hear the reports of the various Coal Division technical committees. Over 200 representatives of mining and manufacturing companies were present to hear and give reports on the progress being made in studies on current mining problems.

These annual conferences not only report on the work being done by committees, but also allow an exchange of views on each study. In this atmosphere much information is interchanged. Those in attendance are benefited by the ideas of the foremost men in mining, as members of the committees are recognized experts in their different fields.

Not all of the interest was confined to the committee reports, however. A luncheon session, presided over by L. C. Campbell, chairman of the Coal Division, was well attended. After calling the session to order, Mr. Campbell spoke for a few minutes about the future of coal. Taking note of the "job that coal mining has been doing in these days of emergency," Mr. Campbell went on to emphasize that "the day of coal is in front of us, not behind us." He commended the Coal Division Committees, and the many research programs sponsored by coal companies and manufacturers for the technical progress in coal mining and coal preparation—progress which has kept the industry abreast of the times.

Much credit, Mr. Campbell said, is due the safety divisions of State and Federal Mining Departments, mining companies and manufacturers of safety equipment for the work they have done in safety. He closed with a prediction of great expansion in the use of coal for generating electricity and as a source for chemicals. He then introduced J. T. Ryan, Jr., chairman of the American Mining Congress' Manufacturers Division, who expressed warm praise for the friendly cooperation between coal mining companies and manufacturers.

Next on the list of speakers was Henry F. Hebley, who spoke about stream pollution. Mr. Hebley emphasized the position of the coal industry in regard to legislation on stream pollution. On one side it is hedged by laws forcing stream clarification and on the other by the fact that there is no economic solution for some of the problems. Research is the answer and much has been done, especially on the acid water problem. This work, being carried on in part by Mellon Institute, is now endangered by the lack of funds and unless money is furnished by industry to carry on, much of it will be lost. There has been a tendency to apply solutions developed for similar problems in the anthracite industry to bituminous coal mining. Mr. Hebley said that this is not possible and bituminous coal's problems can be solved only through continued research by the industry itself.

Charles W. Connor, Defense Solid Fuels Administrator, spoke briefly about some of the problems connected with defense mobilization and our solid fuels resources. DSFA is striving to assure the industry materials and equipment needed to carry on its defense job. As the solid fuels in-

dustry's representative in government, it requests allotments of controlled materials from the Defense Procurement Agency and allocates these to the industry.

Essential needs for coal mine construction projects are being met, Connor said. Reductions made in the first quarter 1952 allotments were confined almost exclusively to copper wire and in this case the reduction averaged only about 10 percent.

Mr. Connor expects an increase in production of both bituminous and anthracite coal in 1952 over 1951 levels. There is a possibility of transportation difficulties and if a serious car shortage should develop in 1952, it will be necessary for DSFA to direct some shipments of coal to areas where the supply is most needed. He concluded by calling attention to the tremendous demand for coal exports, especially to Europe.

With the conclusion of Mr. Connor's statements, the luncheon meeting was adjourned to the Monongahela Room for the afternoon session.

Future issues of MINING CONGRESS JOURNAL will carry full committee reports when the studies concerned are complete and the suggestions offered at the conference have been acted upon. The abstracts which follow were condensed from the reports as they were given in preliminary form at the conference. They recount progress to date on each study and are subject to changes resulting from the exchange of ideas and critical appraisal of men from all parts of the industry.

SURFACE PREPARATION

Committee Chairman
T. W. GUY

STREAM clarification is affecting coal preparation methods. The necessity of preventing the discharge of fine coal into rivers and streams is being met by the development of ways to reclaim coal from the sludge that formerly went into washery refuse. The sales value of the recovered product has, in some instances, resulted in an over-all profit to the mining company, but in any case has served to offset, at least partially, the cost of the recovery process. In order to evaluate the reclaimed product, its size consist and analysis must be determined. There are two methods of screen testing—wet and dry, but these do not give similar values for the same sample of coal. The committee is now making a study with a view toward recommending a uniform sampling and screening procedure so that all such data will have a common basis. A number of preliminary reports on the foregoing subjects were presented to the conference.

SLUDGE RECOVERY IN STRIP MINING

J. J. MERLE

TWO case histories are presented covering typical installation of sludge recovery equipment at cleaning plants in the Illinois-Indiana coal fields. In both operations the purpose is to increase coal recovery, reduce waste and improve the quality of the prepared product. Flow sheets and brief description of plants designated as A and B are given. These are accompanied by pertinent data as to the quantity of makeup and recirculating water and the percentages and size consist of the solids in the water going to the waste ponds—abandoned strip pits or artificial ponds from which any overflow to streams is clear water. Plants A and B respectively recover 22 and 27 tph of marketable coal from their washery waste. The 325 mesh by 0 final refuse after sludge recovery amounts to 33.9 lb per ton of washed coal for Plant A, and 14.5 lb per ton of washed coal for Plant B.

SLUDGE RECOVERY IN PITTSBURGH COAL

V. D. HANSON

THIS preliminary report covers two preparation plants designated as C and D, operating in the Pittsburgh seam, handling chiefly deep mined coal. The purpose of the recovery process is to reclaim fuel from the washery waste and to prevent stream pollution. These data, given in concise form for each plant, cover the water and sludge circuits showing sequence of operations, quantities, percentages of solids, and the size consists in the various circuits. It is interesting to note that in each of these two plants, the sludge is pumped to the waste pond at a consistency of 50 percent solids. The ash in the waste solids is about 40 percent from Plant C and about 50 percent from Plant D. The water going to the waste pond is kept to a minimum.

METHODS OF SAMPLING AND TESTING

IN making this study it was arranged that the committee would secure comparative data on the results of screen tests for size consist made by dry and by wet methods. Several such reports have already been prepared in preliminary form, giving data and test results on coal samples from various fields.

J. J. Merle covers check analyses by wet and dry screening and also submits an account of his sampling method. Samples are taken at regular intervals during the operating day of the plant, with not less than 14 increments in a seven-hr shift. A cutter can is the collecting device used. The gross sample is dried by decantation and evaporation and it is then mixed and riffled to a net of 200 grams. The net sample is dry-screened on all of the sieves and the minus material that passes through the final sieve in the series (325M) is removed. This procedure facilitates the wet-screening process.

George E. Keller shows results of tests by wet and dry methods on a sample of raw ⅜ in. by 0 to secure both size consist and float and sink data. This requires the use of larger samples of the ⅜-in. by 10-mesh sizes and he outlines the method being developed for wet screening such samples.

The cleaning plant is an important stop for coal on its way from face to market

R. L. Llewellyn gives comparative results by wet and dry methods on each of two samples, the Heyl & Patterson method being used for the wet test.

A. C. Gilbert describes the Heyl & Patterson methods used for wet screen testing in the ordinary size ranges and also in the sub-sieve sizes to 74 microns. Graphs showing comparative curves for three tests are included.

The following table shows comparisons of data compiled from Merle, Keller, Llewellyn and Gilbert data. The size consist determinations by wet methods are compared for each fraction with the corresponding size fraction obtained by dry methods expressed as percent of the wet result. These D/W results are obtained by dividing each *dry result* by the corresponding *wet result.*

Screen Sizes		Merle		Keller		Llewellyn		A. Gilbert	
Thru	On	Wet	D/W	Wet	D/W	Wet	D/W	Wet	D/W
—	28 M	16.2%	139%	79.8%	105%	16.0%	149%	54.0%	108%
28 M	48 M	12.0	138	6.1	113	16.0	140	11.5	200
48 M	100 M	10.8	127	3.8	95	13.0	194	9.0	104
100 M	200 M	6.7	136	2.6	88	10.5	106	5.5	69
200 M	0	54.3	70	7.7	45	44.5	39	20.0	26
Totals		100.0%		100.0%		100.0%		100.0%	

The table shows the plus 28-mesh fraction as determined by dry method ranging from 105 to 149 percent of the corresponding fractions obtained by wet screening. Similar comparisons of dry 200-mesh by 0 fractions show a range from 20 percent to 69 percent of the corresponding values obtained by wet screening methods. The other screen fractions by the two methods may be so compared.

F. X. Ferney did not have available comparative data by wet and dry methods but he submitted the results of wet tests made on ten samples: eight on feeds to filters, one on the cake from filter and one on circulating water. These show percentages of minus 200 mesh much larger than would be expected when dry methods of sieving are used. Averages and ranges compiled from Ferney's data show as follows for seven tests by wet methods on filter feeds:

	+ 28 M	28 x 48 M	48 x 100 M	100 x 200 M	200 M x 0
Average Weight	56.2%	8.4%	4.6%	2.8%	28.0%
Range Weight	42 - 68%	5 - 16%	2 - 7%	2 - 4%	19 - 37%

It is interesting to note the high percentage of 200-M by 0 sizes in these feeds due to the build-up of these sizes in the circulating water, obviously increasing the difficulties of dewatering the coal and of desilting the water.

A PILOT FLOCCULATION PLANT

R. A. JIMENEZ

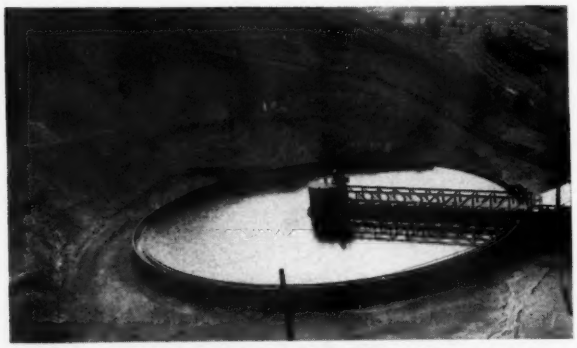
THE original design of a preparation plant called for centrifugal water polishers to clarify a portion of the settling cone overflow. Initial operating experience soon indicated, however, that the raw feed to the plant contained shales and clays which disintegrated when in contact with water. This made a colloidal suspension and the polishers could not prevent rapid build-up of the minus 10-micron high-ash sizes, and balance the water system at any acceptable suspended solids concentration.

A temporary solution to the problem called for bleeding from the plant a limited volume of circulating water containing extreme fines. A series of pumps was installed to carry this fluid to the refuse bank, thereby supplementing the storage and filtering areas available near the plant as settling ponds.

Consideration of all the factors involved caused the belief that a system of flocculation is the most satisfactory and flexible solution to this particular colloidal suspension problem. To that end, in operation for over a year now, a complete pilot flocculation plant was installed within the cleaning plant proper of a major coal producer.

Experiments with this pilot plant have clearly demonstrated that with reasonable dosages of potato starch and lime as the flocculating agents, and under controlled conditions of feed rate and density, the centrifugal polisher is able to produce an effluent containing 0.05 percent solids. At the same time it delivers the caked solids in a state satisfactory for disposal by existing refuse conveyor belts.

Based on these results, it is felt that a large scale flocculation plant can be installed at reasonable cost to remove a sufficient amount of extremely fine suspended solids and maintain the water system at an acceptable and efficient concentration. This would eliminate bleeding or wasting water to ponds.



Water clarification is the final step in sludge recovery

HAULAGE ROADS

Committee Chairman

A. E. BELTON

A large proportion of the coal tonnage mined underground is brought to the outside by mine cars and locomotives. Without any thought of minimizing the importance of the several types of so-called "trackless" equipment, which admittedly have a high performance efficiency for certain conditions, our committee believes that rail haulage will continue to be the backbone of underground transportation for many years to come. Modern large capacity cars and high speed operation is bringing about mine track construction which closely parallels railroad specifications and to meet this trend, the committee is making three studies which are described briefly in the following outlines.

HEAVY RAIL TURNOUTS

J. E. ELKIN

STANDARDS for frogs, switches and turnouts for coal mine tracks were formulated by this committee and accepted by the American Standards Association in 1934. Those specifications have been widely accepted by manufacturers of rail and track accessories so that today all the various parts of a mine track turnout have standard dimensions and are interchangeable. The standards cover up to 80 lb rail. This has proved adequate so far, but increasingly heavy equipment underground is bringing a need for heavier track construction. Anticipating the future use of larger rail, a study has been started on standards for 85-, 90- and 100-lb turnouts by a subcommittee of manufacturers and operators who are thoroughly conversant with all phases of track operation. Their recommendations after completion will be included in the next edition of the booklet "Construction and Maintenance of Main Haulage Roads in Coal Mines," published by the American Mining Congress.

AUTOMATIC BLOCK SYSTEMS

GEORGE F. LEATHERMAN

AN automatic block system for a 4½-mile main haulageway was described in detail at the 1950 Coal Convention in Cincinnati. This installation has been in successful operation for more than two years but some unanticipated problems were encountered.

One of the most troublesome problems was the education of not only the main haulage motormen but everybody who could ever be expected to operate a locomotive or inspection car through the haulageway. For example, the signalling system was designed to keep traffic moving and the first trouble occurred when a gathering locomotive motorman came to the storage track off of a side track for empties. Either because there were no cars or he decided to eat lunch, the motorman stayed on the storage track—this meant there was one block red and nothing moving in the block. Through haulage, of course, eventually came to a complete stop. Other cases of this type occurred when foremen, repairmen, or trackmen would park inspection cars or locomotives on the storage tracks. A decision to mark all trolley contactors with symbols showing their function solved this problem. An "S" lettered on a contactor meant setting of the block, a "C" meant clearing, and a "T" stood for track switch operation. A repairman, for example, could then jump the setting contactor by temporarily dogging his pole where he was parking an inspection car.

There has been added one more signalling device just recently. Within the last 60 days two instances of a few cars breaking loose from the back of a trip and coming to rest in a low curve have occurred. The next trip through this section hit the cars and, although the resulting damage was only to the car which was hit, it still warranted action. A photo-electric cell arrangement was considered and may still be installed, particularly if the inspectors do not approve of the immediate solution. The immediate solution was to insulate a section of rail, similar to the method used by railroad companies. Voltage on the insulated section is held down to 25 v. When the section of rail is shorted to the other rail through the wheels and axle of a car, a relay operates, which in turn lights a red warning signal at each end of that block.

ENFORCING BLOCK SIGNAL INDICATIONS

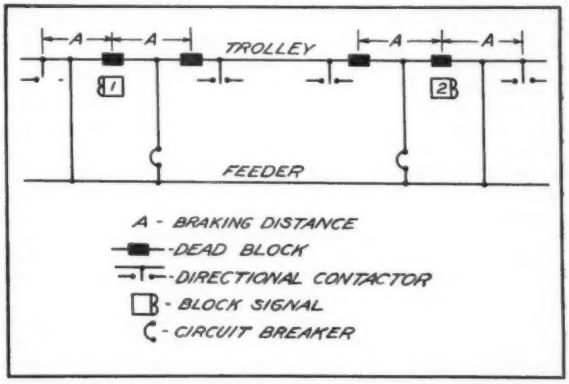
EVERETT BROWN

PREVENTING signal violations by automatically removing power from the locomotive at the same time applying brakes and sand appears to be entirely practicable. No installation has yet been made in a coal mine but preliminary studies have been started. Most of the city subway systems and many miles of railroad track are using several different types of track-mounted automatic stop equipment. As a safety measure for accident prevention with track-mounted equipment in mines, the following proposed system controlled from the trolley wire is suggested as a practical possibility for mining service.

Consider a simple two-point block consisting of a piece of single track protected at each end by a block signal and a relatively short length of dead trolley wire which is automatically energized by the signal control to permit locomotives to enter and leave the block. Two directional trolley contactors per signal are required.

A locomotive entering the protected piece of single track first passes the setting contactor located approximately 100 ft before the signal, changing it to green and energizing the insulated trolley wire extending several hundred feet beyond the signal to permit entrance into the block. Simultaneously the signal at the far end is changed to red. The trolley wire at the far end is de-energized.

After passing beyond the insulated section of trolley



wire, the locomotive engages a second trolley contactor which de-energizes the trolley wire and changes the signal to red behind the locomotive to prevent a second motor from following into the block.

If a second locomotive disregards the red signal indication at either end and attempts to enter the occupied block, brakes and sand will be applied automatically when the locomotive passes on to the dead trolley wire, provided the locomotive is equipped for this system of operation.

When the locomotive in the block reaches the far end, it engages the trolley contactor on the near side of the insulated section of trolley wire which energizes the trolley to permit passage out of the block. The locomotive then engages the second trolley contactor located beyond the signal, restoring both signals and de-energizing the trolley wire.

Most of the nation's coal mines still use rail transportation

UNDERGROUND POWER

Committee Chairman

C. C. BALLARD

DURING the year the committee completed its report on "Grounding and Circuit Protection," which was published in the July, 1951, MINING CONGRESS JOURNAL. The report on "AC Power for Face Equipment" has been approved by the committee for publication and will appear in an early issue. The study on Sub-station Location has progressed and a new study on Cable Insulation has been inaugurated. The latter was set up to make recommendations for outside dimensions of power and control cables, connecting cables between compartments, and packing glands used with connecting cables; all for explosion proof and permissible type mining equipment.

HOSE CONDUITS AND CONNECTING CABLES

A. W. ACOCK AND T. R. WEICHEL

DIMENSIONS of hose conduits and the appropriate packing glands depend upon the outside diameter of cables used. Standard diameters for flame resistant (Neoprene sheath) portable cables are now specified in USBM schedule 2-E, which includes cables for remote control and drill cord. Dimensions for these cables have been tabulated in numerical sequence and the table is included as a part of the committee report. There are approximately 91 standard outside diameters from the smallest to the largest cable but the differences between adjacent outside diameters are so small that it would not be desirable to increase the number.

It was decided to defer the study on hose conduits until the committee obtained more definite information regarding the size and types of cables used with various motors and starters. There is a possibility of eliminating conduits in certain applications; in some cases standard wall thicknesses for portable power cables will be satisfactory, but for other services it may be necessary to use increased wall thicknesses.

Connecting cables used between the compartments of explosion-proof equipment are at present in appropriate hose conduit and the committee recommends that the dimensions in USBM schedule 2-E be accepted. These apply to round portable cables with a flame resistant, neoprene sheath, but the committee suggests that this should be extended to include fibrous coverings such as asbestos or glass braid or any plastic sheath which may be developed in the future. It is possible with such types to obtain a smaller outside diameter than the present standard neoprene sheath cables.

Packing Glands—A task group under the chairmanship of A. J. Buss was appointed to study motor, starter and associated cables. It was recommended that the size and number of conductors used as a lead to motors be based on horsepower rating regardless of the voltage rating in the usual range of 250 to 550 v. Such cables are seldom longer than 25 ft. This group, through A. C. Muir, will contact the AIEE Mining Committee and obtain its cooperation in the study.

AC POWER FOR FACE EQUIPMENT

L. W. SCOTT

THE purpose of this report is to show the need for higher ac voltages for face equipment in coal mines. Mechanization of coal mines, particularly in the greater use of mechanical loaders, conveyors and continuous loaders, has greatly increased power demands. There is a definite economy in the use of alternating current for these applications because of the elimination of conversion losses and the lower cost and maintenance of ac motors. In addition savings of critical power line materials are appreciable. However, this development faces the danger of being limited by regulations based on experience with direct current. In order to assure that necessary regulations are based on sound thinking, and to allow the most economical use of ac power, without compromising safety, the committee proposed to analyze the various safety and economic features to be considered.

Proper location of underground substations is important for trouble-free operation at the face

Efforts must be made to secure permission, where such is not now in effect, for the use of 440 v.-ac grounded Y circuits for face machines with the following requirements: (a) The circuits and the frames of all machines should be grounded in accordance with the report "Grounding and Circuit Protection" by the AMC Power Committee, published July 1951; (b) single phase 110-v. hand drills should be supplied from separate 440/110 transformers to comply with the Federal Code; (c) all grounds should be tested at the beginning of each shift.

Effects of electricity on the human body are governed by many factors. Most of these vary with the condition of the body, type of circuit, voltage and frequency. Of necessity, very little experimental data is available. In general, the amount of current flowing through the body is the governing factor in the extent of injury caused by electric shock. The amount of such a flow is proportional to the voltage and inversely proportional to the sum of the resistances of the body and that of the contacts with the circuit. It is self-evident that the safest circuit, in the medium voltage range, is the one with all wires insulated.

The three-phase grounded Y circuit with a line to line voltage of 440 v. assures a maximum to ground of only 255 v. which is less than the maximum allowed for trolley wires in any state. The chances of a shock from phase to phase are exceedingly remote. When the frames of all machines are grounded, the only way a man can receive a line-to-line shock is by opening a switch box and placing his hands inside.

VENTILATION

Committee Chairman

STEPHEN KRICKOVIC

AS a preamble to this report it should be stated that the committee does not intend to prepare ventilation standards for belt haulage. Since a "standard" conveyor system has not yet been developed for coal mining, it necessarily follows that a "standard" ventilation system is not possible. The purpose of the report is to discuss factors that should be given consideration in an underground belt installation.

Present methods of belt transportation are designed to meet the conditions encountered in each individual operation. These conditions and consequently the requirements are by no means uniform. There are different seam heights; different grades; different haulage distances; different tonnage capacities; and various transportation layouts, to serve different types of mining systems. As a further complication, many of the present belts were installed in mines originally planned and projected for rail haulage. Thus, the conveyor system is often governed by what is possible, rather than by what is actually desired.

Each of the foregoing factors has some effect on the method of installing and operating a belt conveyor and on the ventilation plan. Many of the differences apply only to details but there are certain fundamentals which apply to all. Cleanliness (good housekeeping), maintenance, inspecting, roof support, drainage, rock dusting and other safety measures are governed by the same principles of good mining practice that apply to all operations.

VENTILATION FOR BELT HAULAGEWAYS

A. J. OPPERMAN

VENTILATION has not been considered a major problem because the question of getting adequate air through a conveyor haulway as compared to face ventilation has never presented any major difficulties. Recently, however, questions have been raised as to the fire risk in a belt conveyor underground. It is true that this hazard does exist but it is equally true that there are similar hazards of equal potential danger in any coal mine—insulated cables, timbering, lagging, and the coal itself. Since it is not possible to eliminate these combustible materials, the best that can be done is to see that they are used in such a way that their fire hazard is reduced to a minimum. This is accomplished largely by good housekeeping—eliminating the accumulation of all waste material—including coal spillage—and by proper maintenance to see that there are no frozen idlers, belt slippage or other source of heat generation. A final precaution is to provide fire extinguishers and escape-ways so that in case a fire does break out, men will not be trapped underground.

Each mining company has individual ideas for taking the foregoing precautions and the committee report will present several typical methods which are now in use. In some mines, multiple entries are driven for development. In such operations it is comparatively easy to locate a belt conveyor on a so-called "neutral" airway—that is, one isolated from the main ventilating system. Two such plans have been submitted for the committee to study.

Plan A covers a five entry panel with the belt conveyor in the center heading. This plan is projected for an operation now in the process of being installed. There will be a small quantity of intake air in the belt entry, controlled by stoppings in the break-throughs on each side, with an incombustible box check placed near the drive and another one near the tail. At various intervals the air in the belt entry will be by-passed by a regulator. Certain sections could then be short-circuited in case a fire should start. A sketch showing the complete installation was submitted for discussion and will be included in the final report.

Plan B, submitted by W. D. Meakin, shows a section of a mine in present operation with one panel developing and two panels with the rooms retreating. Four entries are driven for each panel with the belt conveyor in the second entry isolated by stoppings from the main ventilating circuit. The panel air intake is in the extreme left heading with the return air coming back through the extreme right heading. A box regulator allows a small amount of air to circulate through the belt haulageway. An air lock which prevents short-circuited ventilation in case a door is opened, can also be used to short circuit the air in case of a fire on the belt. This would keep smoke from going to the working places. The sketch, together with a complete description, showing air locks, doors, stoppings, etc., will be included in the final report.

MECHANICAL LOADING

Committee Chairman

J. F. MAZZA

DURING the past year the study on "Training Supervisors for Continuous Mining" has been completed by E. H. Johnson and R. E. Charlier. Methods used by various coal companies were incorporated in the report which, under the title "The Foreman and the Machine," was published in the December, 1951, MINING CONGRESS JOURNAL.

A new study designed to promote uniformity in the operating controls of mobile mining machines has been started. Visibility in coal mines is often poor, so it would seem to be in the interest of efficiency and safety to standardize the controls for mobile equipment made by the various manufacturers so that an operator having learned one would be familiar with all. The same idea was behind the standard gear shift for automobiles. Specifically, this means that all crawler mounted machines should have control handles arranged so that if they are pushed forward, the machine will move forward, or, if they are reversed, the machine will move backward. Standardization of other features, such as markings of control handle name plates, etc., will also reduce chances of confusion among operators and greatly increase safety.

UNIFORMITY OF EQUIPMENT CONTROLS

F. R. ZACHAR

AN examination of the controls of several widely used loading and cutting machines indicates that there is at present a great deal of uniformity. The subcommittee, after consideration of present designs, decided to make the following preliminary suggestions and to stay within the scopes of location of controls, direction of movement for controls, and designation of controls.

Controls should be located within convenient, comfortable working reach of the operator. They should be so arranged that they correspond, in position, to the location of the part of the machine they control. For example, head controls of a loading machine should be located toward the head while boom controls should be located toward the rear. Start and stop controls should be located within reach of the operator's normal position. Any emergency stop or safety switch should be located where it can be easily and quickly reached from the helper's normal work position, or from the normal position of others who may work around the machine if no helper is customary.

Also, it is suggested that controls be moved in a uniform direction for any particular function of the part of machine controlled. A study of present equipment indicates that in a large part this has already been adopted, and the following suggestions are made to conform with what is most prevalent in present designs.

Vertical motions, such as raising or lowering booms or heads.

(1) Vertical lever—pull to raise, push to lower.
(2) Horizontal lever—lift to raise, push down to lower.
(3) Slide lever—pull to raise, push to lower.

Swinging motions, such as swinging head or booms.

(1) Vertical lever—push to swing away from operator and pull to swing toward operator.
(2) Horizontal lever—push down to swing away from operator and pull up to swing toward operator.
(3) Slide lever—push to swing away from operator and pull to swing toward operator.

Turn-over motions—cutting machines.

(1) Vertical lever—push to roll away and pull to roll toward operator.
(2) Horizontal lever—push down to roll away from operator and pull up to roll toward operator.
(3) Slide lever—push to roll away from operator and pull to roll toward operator.

Tramming controls—the most acceptable type seems to be a vertical lever that is moved forward to tram ahead and moved rearward to back up. If impossible to install this type, then the following could apply:

(1) Vertical lever—push to tram forward and pull to reverse.
(2) Horizontal lever—raise to tram forward and push down to reverse.
(3) Slide lever—push to tram ahead and pull to reverse.

All controls on machinery should be marked with a suitable name plate giving the functions of the control and the directions of use marked thereon with arrows. It is also suggested, in order to give the operator the ability to know his levers by feel as well as by knowledge of their position, that levers for different motions be capped by different-shaped handles—for example:

(a) Vertical motions—a cube knob handle.
(b) Swing motions—a ball knob handle
(c) Tram or Steer—a disc knob handle.

CONVEYOR MINING

Committee Chairman
A. E. LONG

SERVICE HAULAGE FOR CONTINUOUS MINING

THIS study has been suggested in recognition of the fact that the production of a continuous mining operation is primarily dependent on taking coal away from the machine as fast as it is mined.

It has long been a policy of the Coal Division to report only on machines and methods where the study was based on a considerable background of operating experience. However, in the case of continuous mining, the committee has recommended that this policy be modified. It is felt that a report covering machines and equipment in the experimental stage would bring to the attention of the industry the various ways and types of equipment now projected and could help accelerate their development.

Accordingly, the committee is gathering accounts from mines which are using or experimenting with various types of haulage equipment for continuous operation. Four preliminary reports have already been received. These are summarized in the following accounts and other reports are in the process of preparation.

Something along the lines suggested in the following account will be a necessity. The type of service needed for continuous operation means that existing haulage equipment may have to be modified or new types designed to fit operating needs.

A STATIONARY BELT STRIPPER

T. L. AITKEN AND R. U. JACKSON

THE equipment described in this report is a movable or extendable belt conveyor, 450 ft long, with a conventional automatic belt tripper. The automatic tripper, in its normal function, provides a movable discharge point, or series of discharge points, along the length of a fixed conveyor. In the present application, this arrangement is reversed. The tripper is stationary and discharges onto a transporting unit at a fixed point. The conveyor itself is moved ahead. In this way, the tail end of the belt, at the face, advances as the room or entry is driven, so that the boom of the mining machine has a continuous loading hopper.

When these conveyors are used to develop entries or air courses, and the faces have advanced far enough to accommodate the extended full length of the conveyor (approximately 450 ft), all that is required to continue to advance is simply to move the tripping discharge device forward to a new location, the conveyor remaining intact as a unit moving forward as the face advances. The conveyors are kept in proper alignment by vertical rollers mounted on standard roof jacks. Spaced at eight-ft intervals, these are very effective and also add to roof support. The report includes a sketch showing the location and application of two units which were used to drive two parallel air courses a distance of 1000 ft each.

A BELT CONVEYOR TRAIN

HERMAN L. THOMAS

EQUIPMENT described in this report consists of a train of belts. These are mounted on frames and pneumatic tires and operate between the loader and the main transportation system. The train is made up of a receiving end section, a discharge end section and a specified number of intermediate sections and may be 300 to 400 ft long. The receiving end section can be attached to the loader and is designed to advance automatically, controlled by a tension switch located in the coupling. Each section contains its own motor and all are controlled simultaneously by one central switch. The discharge end section delivers

Conveyors have become conventional equipment for service and intermediate haulage

coal continuously to the main haulage system as fast as it is mined.

The conveyor train can be trammed in either direction and controlled from either end of the complete unit. Steering is mechanical. The unit will follow and track each other when travelling in either direction.

Train length is determined by mining conditions. Once this length is determined for most economical operation, the unit should be considered complete. Its length should not be changed thereafter. The discharge end section travels parallel to the belt conveyor. This permits mining a distance the length of the train in any direction, right, left or straight ahead from the tail or receiving end of the conveyor.

A SERIES OF PORTABLE CONVEYORS

H. W. NEWTON

ONE system mentioned as practical for taking coal from a continuous mining machine is called the "cascade system." This is a series of portable conveyors. Each unit is short enough to be moved through break-throughs and around corners and discharges one to the other. These conveyors are self-contained units with permissible motor, cable and permissible junction box with disconnect switch. They overlap so that they may be telescoped for flexibility. Capacity is about 120 tph. A removable feed box is attached to one unit but no mechanical connection is made with the loader. The conveyors were used experimentally to convey from a loading machine picking up the coal deposited by a continuous machine. About 50 tons per man shift was loaded in this manner. The chief advantage of the system is that mining can proceed independent of the transportation system.

AN ENGINEERING STUDY ON CONTINUOUS TRANSPORTATION

J. Z. LINSENMEYER

A STUDY of the many new problems posed by the so-called "continuous-type mining machines" has led to the conclusion that this method of mining cannot be developed without some method for the continuous transportation of the coal away from the mining machine. After a detailed engineering study, a system of transportation has been designed which makes use of three devices termed the mobile transporter, the portable conveyors and the discharge conveyor. It should be explained, however, that this is still in the drawing-board stage and is not yet in operation.

The Mobile Transporter which receives the coal directly from the mining machine consists of two crawler-mounted conveyors and is self-propelled. The upper conveyor can be extended and retracted 17 ft. Its receiving end, coupled directly to the discharge of the extractor, is free to move up and down and swing through a wide angle above the lower conveyor over which it travels, and on which it deposits its burden. This extensible conveyor follows the movement of the mining machine.

The Portable Conveyor receives the material from the transporter. To provide for lengthening the system as the face is advanced or shortening it on retreat, a portable conveyor will be used, mounted on two rubber-tired wheels. Through the steering mechanism the conveyor structure can be moved forward, backward or sidewise. Quick-acting couplers, operable from either side of the conveyor, permits units to be coupled to each other and to the transporter.

The Discharge Conveyor similar to the extensible conveyor on the transporter, is mounted on and moves over the tail pulley sections of the entry conveyor. Its receiving end can be raised, lowered, and swung to the right or left. Its discharge end is hinged on rollers that operate in channels attached to the two sections of the entry conveyor.

A complete electrical motor and control system has been designed to permit the operator from his normal position on the mining machine to control the motion of the transportation system. The conveyors may be stopped at any location along their length, and can be started at will or automatically in response to motion of the entry conveyor. They start in sequence beginning with the conveyor nearest to the entry. Each unit is driven by its own motor.

FIRE PREVENTION FOR UNDERGROUND BELTS

C. W. THOMPSON

A BELT conveyor, being composed of combustible material, presents a certain fire hazard, and the committee report will deal with causes of belt fires as determined by recent laboratory and field tests, in both this country and in England. The results of these tests, which will be given in detail in the report, are extremely interesting. For example, it is difficult to ignite a moving belt by friction against a frozen idler, coal, or parts of the conveyor frame. Apparently the moving belt conducts the heat away as fast as it is generated. However, this does not excuse improper maintenance. Under the conditions just described, sufficient heat can be stored up so that the belt will start to burn when it stops running. The greatest danger is from pulley slippage while the belt remains stationary. This is a real hazard and should be prevented. The report when completed will deal with other fire causes and preventive measures.

ROOF ACTION

Committee Chairman
FRANK G. SMITH

SPECIFICATIONS FOR ROOF BOLTING MATERIALS

W. D. NORTHOVER

THE committee's study of roof bolting specifications has raised some conflicting opinions. However, it should be stated that the study has accomplished its primary purpose of bringing to the attention of the industry the fact that roof bolting materials should not be selected at random but must be based on the work which the bolts have to perform. In order to prevent any misunderstanding of the committee's position in this matter, the following brief history of the progress of this study seems advisable.

At a meeting in July, 1950, the Roof Committee was requested to determine whether a set of roof bolting specifications, acceptable to coal operators and manufacturers, could be developed. The purpose as stated was "to cover dimensions and strengths for bolts, nuts, washers and bearing plates in order to eliminate existing variations and to prevent failures through lack of strength in the materials used." Roof bolting had had a phenomenal growth; techniques and materials were being determined largely through trial and error. Such methods resulted in the wide variety of sizes and designs used by various companies. There appeared to be a real need for the proposed committee study.

Investigations carried on over the succeeding six months

indicated that a certain degree of uniformity in materials and methods was practicable and a set of proposed specifications was prepared by the committee and published in the March, 1951, MINING CONGRESS JOURNAL. It was clearly stated that these were only tentative and were presented to the industry for comment. Following the publication, some exceptions were taken to certain of the items. Accordingly, a revision was made at a meeting during the summer of 1951 when it appeared that an agreement on the controversial points had been reached.

However, during the preceding 12 months while the study was being made, a number of equipment manufacturers as well as coal companies had developed their own bolting techniques and had adopted their individual specifications. These companies now feel that any attempt to standardize bolting material is not needed; such items as the rod diameters, screw threads, plate thicknesses, etc., are already standardized and from these standards they can select the combination of size, lengths, etc., that best suits their roof conditions. This situation leaves little hope of getting an immediate agreement and it seems obvious that roof bolt specifications representing a unanimous opinion cannot be set up at this time. The matter, therefore, was referred back to the subcommittee to see whether or not any compromise or alternate plan can be formulated.

ROOF BOLT TESTING

J. S. WHITAKER, L. A. PANEK, G. R. SPINDLER

THIS study was set up in the summer of 1950 and the committee prepared an outline of the points to be covered. These included (a) use of torquemeter in testing work; (b) use of a hydraulic pulling device to determine bolt anchorage; (c) conditions affecting torque tension and relationship; and (d) purpose and use of strain gauges.

It was recognized that this was quite an ambitious program. There is a definite balance that has to be reached in a successful roof bolt application;—the torque needed to pull strata together for strength must be kept under the limit that would cause the roof rock to crush. To determine these two limits is not a simple matter.

The U. S. Bureau of Mines and West Virginia University cooperated in the study by making laboratory and field tests, and the committee also attempted to get actual operating results from coal companies. A data sheet for this purpose was sent out, but so far the replies have not produced any information of value. This leads to the belief that mining companies depend on observations and trials to determine bolting technique. The reason for this may be that few companies have technical staffs or equipment to make the type of tests needed. Both the Bureau and the University report progress in their laboratory and field work but have not yet reached the point where data can be published.

Another line of investigation has been suggested. Not directly concerned with roof bolting, it deals with a method to determine roof pressures under various depths of cover. This is to include initial pressures and also those which develop later when partial and complete extraction is carried on. This is a difficult problem to solve and will require an intensive program of tests—probably a joint effort by the Bureau of Mines in cooperation with the various state departments and individual coal companies. The Roof Committee believes that this suggestion has much merit and is taking the matter under advisement.

ROOF SUPPORT FOR CONTINUOUS MINING

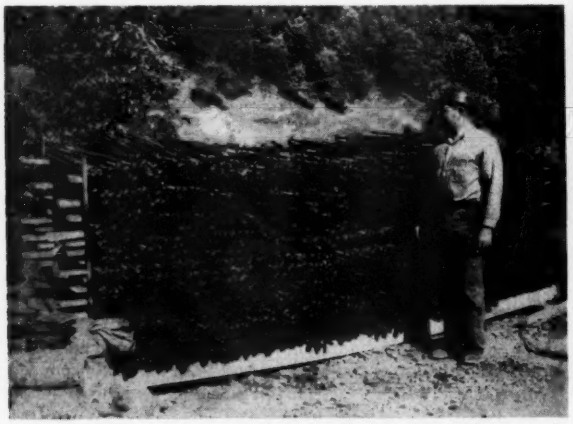
E. H. JENKS

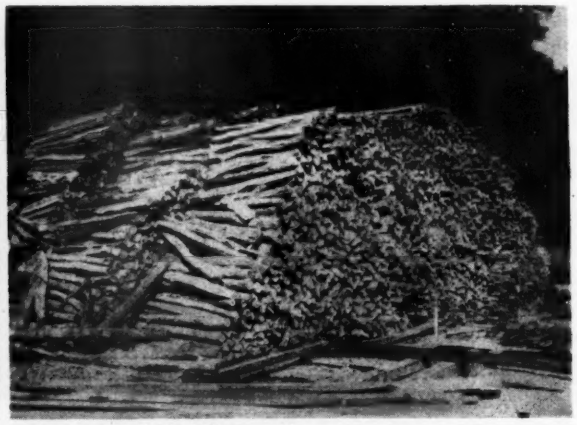
THIS is a joint study by a subcommittee with members representing the Mechanical Loading and Roof Committees. A preliminary meeting on September 11 brought out the following points which were taken as the basis for subsequent study:

(1) That the future of continuous mining is directly dependent on the development of some *continuous* method of roof support.
(2) That no present type of roof support has proven satisfactory for continuous mining except where top conditions are exceptionally good.
(3) That some new method and/or material of continuous roof support must be devised that will be adequate for tender roof and can be applied without interrupting the machine operation.

In meetings held recently, consideration was given to roof support methods now in use which are not "continuous" but do give a minimum delay to the machine. However, the committee felt that other methods were needed and that only through experimentation by coal companies and manufacturers would the problem be solved. Several ideas were proposed, among which were: driving short pins into the roof, pressure grouting, collapsible or hinged beams, a caterpillar-mounted movable support, or a wheel whose diameter would be approximately seam height.

As can be seen, the committee's thinking is not along conventional lines. An idea which seems radical or even impracticable at this time may prove to be the answer and the committee believes that once the importance of this problem is realized, there is sufficient talent within the industry to work out the solution.





Use of roof bolts eliminates, to a large part, a supply handling problem

Times Have Changed . . .

HAND STEEL ON HARD ROCK
Missouri lead mine—about 1890. It took strength to swing the hammer, nerve to hold the bit, and skill to place the holes.

An enlargement of this photo suitable for framing is yours for the asking.

Many practices once considered the last word in progress have gone the way of hand steel. Today, the demand for ore calls for making the most of every new development in blasting methods.

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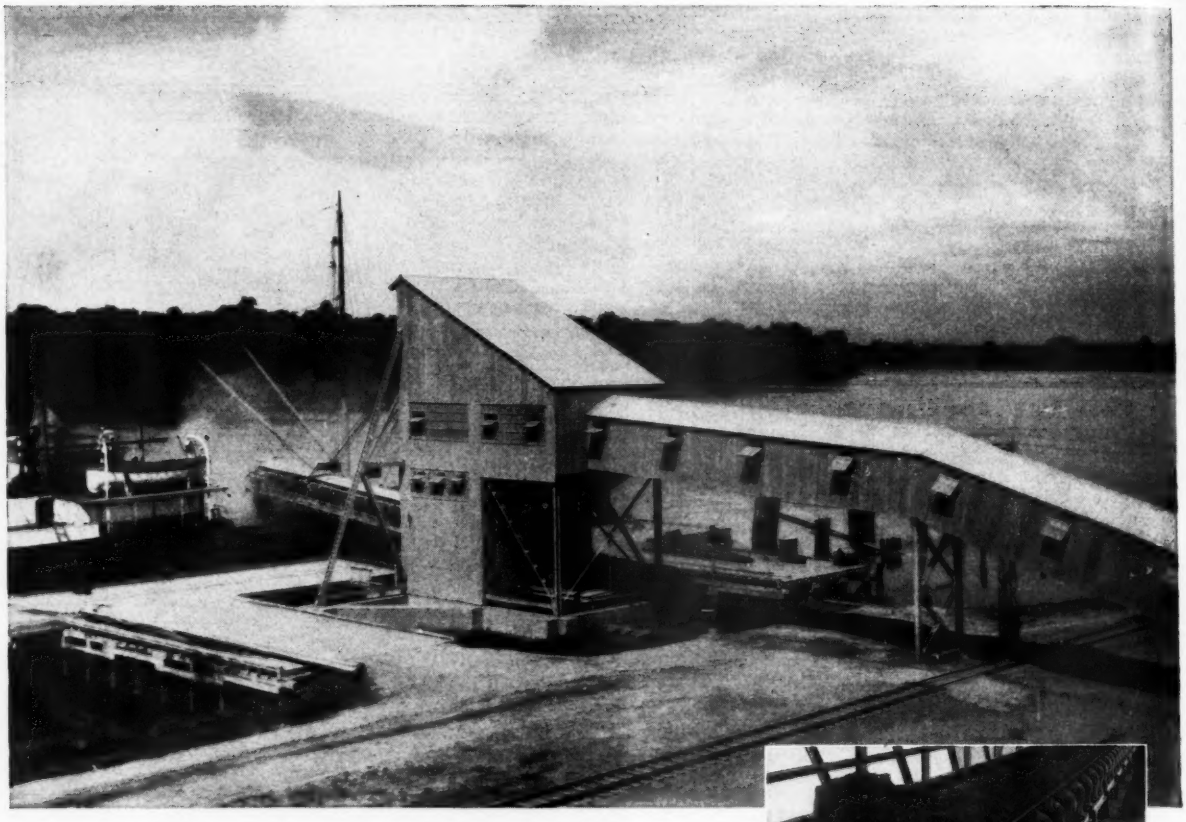

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Automatic monitor stacks gravel with a three-in. tip under 35 lb pressure

Automatic Monitors Cut Placer Mining Costs

Alaskan Mine Operator Makes Marginal Ground Pay By Reducing Stripping Costs 96 Percent

By JOHN MISCOVICH

Partner
Miscovich Brothers

RISING labor costs and a fixed gold price working together have put a squeeze on gold miners. This set of circumstances has had the effect of reducing the amount of gold-bearing material that it is economically feasible to mine. There is not much that an individual miner or mine operator can do about this situation, except in one direction—that of reducing operating costs.

One step that way has been made by an Alaskan placer miner who has come up with a method to move frozen overburden and gravel more cheaply.

Ever since the discovery of free gold in stream channels and gravel deposits, man has been engaged in separating the precious metal in a variety of ways. Nearly all processes of placer mining use water, running at natural velocities or under pressure, to disintegrate earth and gravel deposits and then to make a gravity separation of the heavy particles. Sluices, "shear boards," booming and other means all have been used. All efforts were aimed toward economic extraction and complete recovery of the gold.

Monitor Developed in 1870

Water under relatively high pressure was first used about 1870 when the first hydraulic giant was built by a man named Hoskins. This progressive step enabled man to direct high-pressure streams where the water would do the most effective work.

Many improvements were made on Hoskins' machine and the Fisher-type design, developed about 1875, was considered the most satisfactory. Until recently, the constant search for a more satisfactory unit has met with small success. Work on the giant is difficult and exhausting. The operator is subjected to an almost constant ice-water bath and must possess a strong back to direct the nozzle from place to place. The monitor is a heavy unit, usually weighing more than 450 lb, and must be torn down and reassembled in each move. King-pin wear and frequent leather gasket replacements make maintenance of the monitor a never-ending expense and nuisance.

All of these problems are magnified when operating in frozen ground. For example, the Miscovich Brothers, who operate a placer gold mine in the Flatt Creek area of Poorman District, about 65 miles south of Ruby, Alaska, have to wash away 40 to 45 ft of frozen muck to uncover 15 to 20 ft of gravel with a six-in. to two-ft pay streak. The operating season is short—100 days in 1951—the water supply is not uniform, and the ground is in the perma-frost zone, i.e., all frozen. In operations on frozen ground, water has a double duty: first to thaw the ground, then carry it away.

Inherent Moisture Aids Stripping

Frozen earth in the perma-frost zone has a moisture content of from 10 to 90 percent. If the layers of thawed material can be continuously removed, the thawing action of the water is fully utilized and the washing action is aided by the moisture pres-

ent in the thawed material. Thus, only a small amount of water is required to keep an area clean at all times.

Constant removal of thawed material also exposes a fresh-frozen surface to the elements which also aid the thawing. Every time hydraulicking stops, the surface dries out and acts as an insulator to material below.

Few mine owners can afford the heavy expense of operating monitors on perma-frost 24 hr a day. Stripping is, therefore, limited to that amount ahead of mining required for a season's gold production. At the same time, thousands of yards of thawed muck freeze again because the operator with a limited crew is unable to take advantage of this condition and available water.

One answer to these problems is an automatic hydraulicking device. An automatic giant would mean the elimination of one of the largest cost items—the $2 an hour monitor operator. It would also mean that, with enough units on hand, all available water could be profitably used 24 hr a day.

Such a unit has been developed. It has an automatically controlled horizontal and vertical traverse. Movement is controlled automatically by two pistons powered by the water flow. The pistons, one for vertical travel and the other for horizontal movement, are encased in two six-in. cylinders and powered by water admitted through valves on the giant. An external deflector is also included to permit periods of manual operation. Horizontal travel is limited to 320 deg, or any part of this field, and the maximum vertical sweep possible is 60 deg above horizontal and 40 deg below. Traverse speed is adjustable in either direction. It may be made fast in one and slow in the other.

New Giant Lighter

Made of 14-gauge material, the automatic giant weighs 350 lb, fully equipped and assembled. During the past season operating pressures varied from 15 to 75 psi with efficient use of water at all pressures. Each unit has withstood test pressures of 150 psi with no indication of structural weakness.

At the Poorman operation of the Miscovich Brothers last summer (1951) 173,760 cu yd of frozen muck was removed by hydraulicking with the "Intelligiants" (60 days sluicing time) at a total labor cost of $700. This amounts to 0.4 cents per cu yd as compared to a cost of 10 cents per cu yd in 1947 for stripping with manually directed giants. In each case the costs include laying pipe, moving the giants, water maintenance, and monitor maintenance (none required

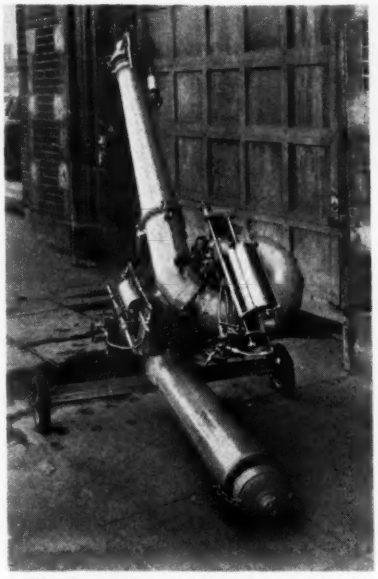
$22,000 worth of gold in the pan made John Miscovich grin

To strip and mine a block of frozen ground, 55 ft deep, in 70 days is an outstanding accomplishment

Experiments are being carried on to determine the best working pattern for the machine

on the automatic giant). Initial cost of the equipment and ditching costs are not taken into account in either year. Flexibility of the automatic monitors allows full use of available water around the clock; units being added or shut off as the water supply increases and decreases from spring runoffs and intermittent rains. During 1951 operations at Poorman, one to 12 units were in operation, according to water availability.

With the automatic giants, it is economically feasible to strip far in advance of actual mining. Therefore, only the available water supply limits overburden removal and pay dirt can be uncovered several seasons ahead.



Weight of the water passing through the gun balances it

Stacking tailings with the "Intelligiant"

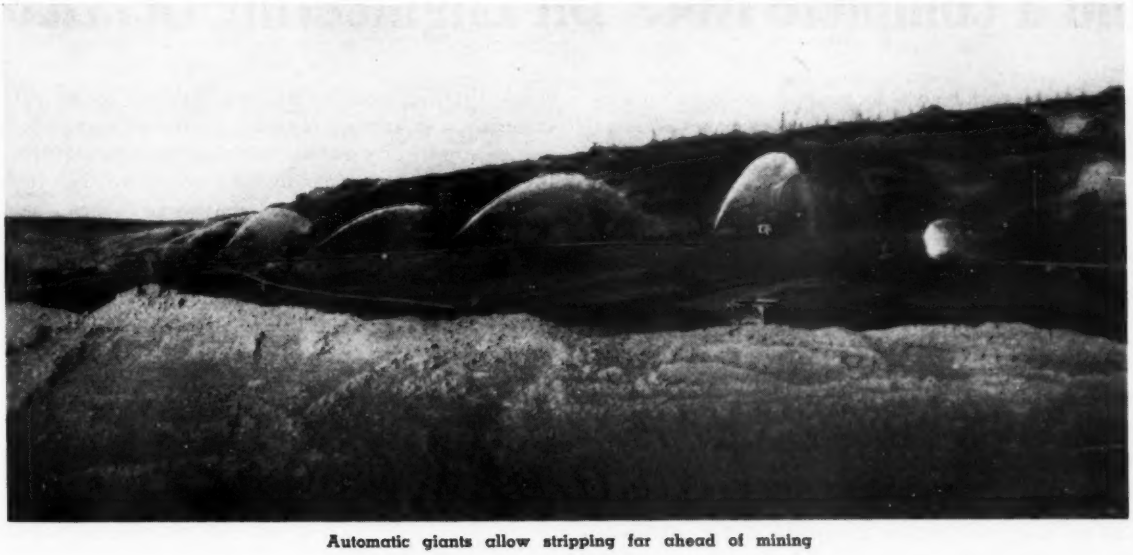
Under such conditions, in a dry season water can be taken away from stripping operations and concentrated on the mining of gravel or pay strata.

Water Balances Gun

Design of the "Intelligiant" is such that the water passing through the gun weighs it down and balances it. Because of their large cross-sectional area and smooth surfaces, the large loops contain enough water to do this without hampering the water flow. Instead of using ball-and-socket connections and king bolts, movement is made through two full-flow design bearings. This permits the parts to be turned around the outside of the water flow, and makes possible uncurtailed flow at any angle of operation. The only anchorage needed on the gun is directly to the rear, simplifying moves. Bearings are greased once a month through a Zerk fitting and work does not have to be halted for this bit of maintenance.

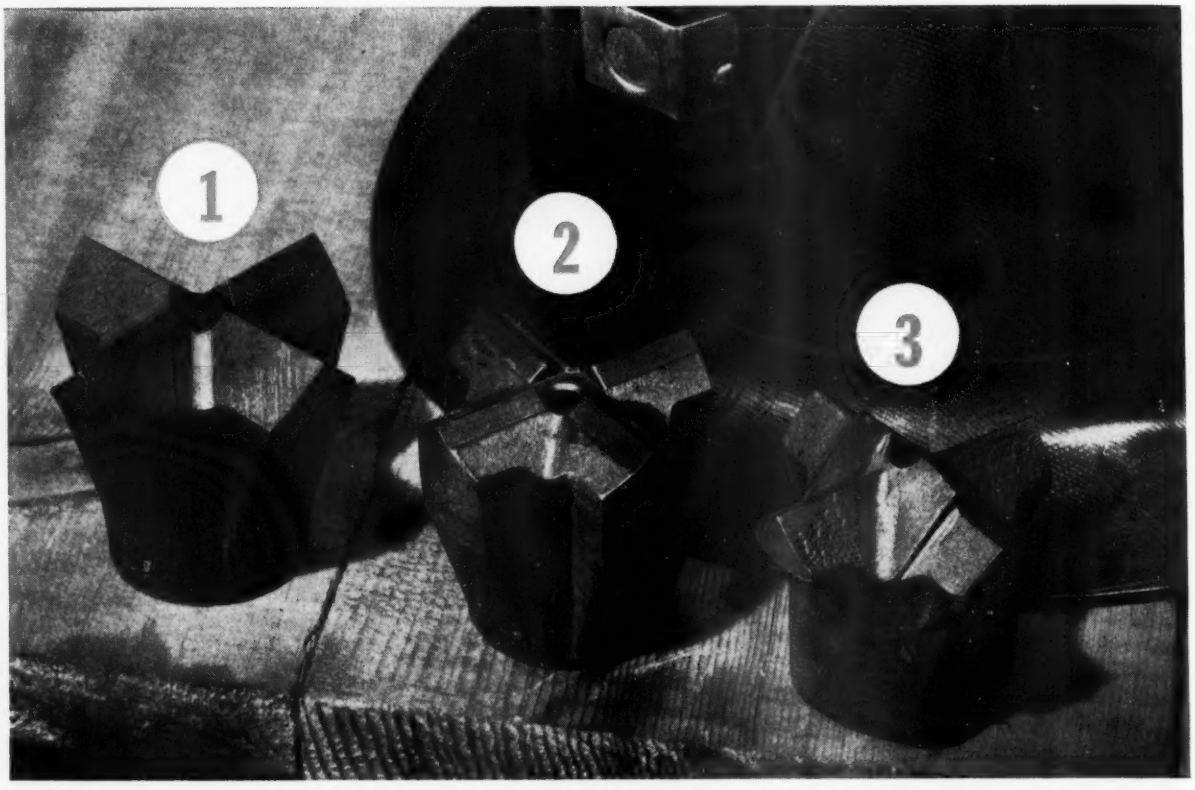
More study is needed to determine the best pattern for the machine to work on. Results so far, however, have shown that it is possible to stack tailings with the unit and move material into a bedrock box efficiently.

Adoption of this unit has turned an unprofitable operation into one which yields a good return. Its use partially offsets the inequities of a fixed gold price vs. rising operating costs.



Automatic giants allow stripping far ahead of mining

Only the Timken Company offers all 3 rock bit types



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1952 Coal Convention

Cincinnati, Ohio—May 5-7

PLANS for the Coal Convention in Cincinnati, May 5-7, at the Netherland Plaza Hotel are rapidly going forward. The program is being whipped into shape and bids fair to make the 1952 meeting the most interesting and constructive that the coal industry has ever held. The Program Committee received hundreds of suggestions for subjects to be discussed—and, refuting the once popular idea that coal is a backward industry, the majority of these suggestions covered new developments, either in mining methods, preparation processes or utilization.

Out of the wealth of material available, the Committee had some difficulty in determining how to give adequate coverage to coal's progress in the allotted three days' time. Coal mining is no longer the simple process that it once was, and for each operating phase there are now several methods and different types of equipment to choose from. Mechanical loaders, continuous miners, augers; track, tractor and rubber-tired mounting; rail haulage and belt haulage; timbers, steel supports and roof bolts, all offer the operator a variety of choices to meet individual conditions. For the preparation plant there is the same multiple choice of processes.

It is obvious that a three-day convention can not describe every type of machine and every condition of mining. The Committee is endeavoring to form a program which will cover improved practices with traditional equipment as well as the application of new types that are still in the experimental stage. These latter will be included in the program in order to add impetus within the industry to further experimentation and to accelerate the development of those types which have already made their appearance.

As a change of pace from preoccupation with more technical matters, the social aspect of the convention has not been neglected. There will be two luncheon meetings where those attending will hear from prominent figures in the national picture. An informal evening affair has been scheduled and, as usual, there will be plenty of opportunity for just plain visiting.

Those who plan to attend should make hotel reservations direct with any of Cincinnati's famous hostelries. This formality should not be delayed. A record attendance is expected and accommodations will be at a premium.

Outline of Convention Sessions

MONDAY, MAY 5

Morning Session

COAL UTILIZATION-MATERIALS CONTROLS

New Developments for Coal Utilization
Materials and Machinery for Coal Mine

•

BUSINESS LUNCHEON—*Subject to be announced*

•

Afternoon Sessions

ROOF SUPPORT

Wet and Dry Roof Drilling
Roof Bolting in Pillar Recovery
Overall Economies of Roof Bolting

STRIP MINING

Overburden Blasting Techniques
Road Construction and Maintenance
Progress of Rotary Drilling

TUESDAY, MAY 6

Morning Sessions

NEW DEVELOPMENTS

Auger Mining Underground
Breaking Coal at Face
Experimental Longface Mechanical Mining

UNDERGROUND HAULAGE

Belts for Slope and Main Line Service
Modern Underground Rail Haulage
Belt Installation, Operation and Repair

MANAGEMENT

Cost Control and Tonnage Expectancy
Industrial Engineering in Coal Mining
Training for Supervisory Personnel

•

BUSINESS LUNCHEON—*Subject to be announced*

•

Afternoon Sessions

CONTINUOUS MINING

Progress Review of Continuous Mining
Pillar Extraction with Continuous Machines
Size Consist of Continuous Mining

STRIP MINING

Strip Methods in High Overburden
Overburden Haulage by Belt Conveyors
Stripped Land Rehabilitation

WEDNESDAY, MAY 7

Morning Sessions

POWER AND MAINTENANCE

Modern Lubrication Practices
Underground Power Transmission
Maintenance for Continuous Mining

SAFETY

Coal Dust Control Underground
Fire Prevention for Belt Conveyors
Man Trips for Track and Belt Haulage

Afternoon Session

COAL PREPARATION

Heated Cloth Screening
Water Clarification and Sludge Recovery
Review of Dense Media Separation

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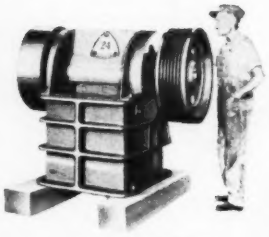
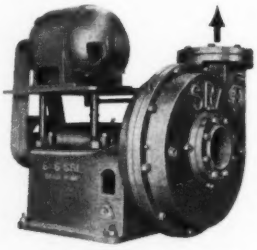
ANNUAL BANQUET—*Wednesday Evening*

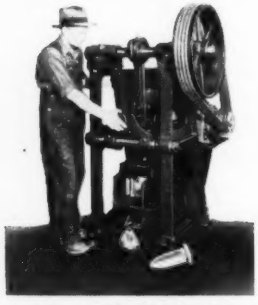


Denver Forced Feed Jaw Crusher

Denver Vertical Sand Pump

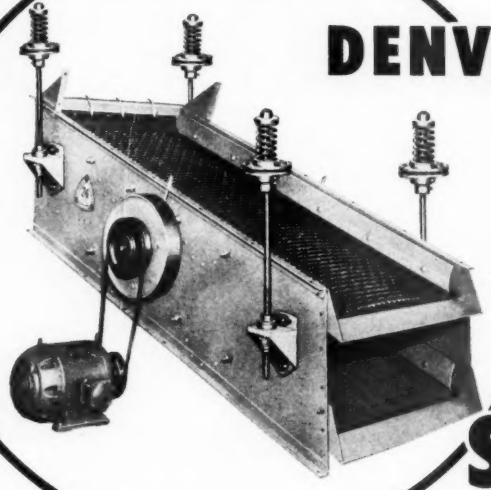


Denver SRL "Rubber Lined" Sand Pump



Denver Adjustable Stroke Diaphragm Pump

FLOATING CIRCLE



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OPERATING DATA

Horsepower — 3 H.P. (for 4′ x 8′ Single Deck)

Shipping Weight — 1490 lbs. (4′ x 8′ single deck bare screen for domestic shipment).

Low Power Cost — Floating circle, 2-bearing action causes rapid screening; oversize actually floats over screen; power cost is reduced as much as 50%.

High Capacity — This screening action (1) gives more accurate sizing (2) eliminates dead weight; permits less bulk in screen frame (3) gives full screen area capacity.

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Complete ore dressing equipment from...testing...to feeder ...to dryer.

DIMENSIONS

Screen Size			*Dimensions			*Approximate Shipping Weight, Lbs.	
W	L	H.P.†	L	W	H	Domestic	Crated for Export
1′	3′	⅓	3′-2″	2′-0″	2′-4″	240	290
1′	4′	½	4′-1″	2′-0″	2′-9″	280	335
1½′	3′	½	3′-2″	2′-6″	2′-4″	275	330
1½′	4′	½	4′-1″	2′-6″	2′-9″	320	385
1½′	6′	¾	5′-11″	2′-6″	3′-6″	400	480
2′	4′	¾	4′-1″	3′-0″	2′-9″	380	455
2′	6′	1½	5′-11″	3′-0″	3′-6″	980	1175
3′	6′	2	6′-1″	4′-3″	3′-9″	1075	1290
3′	8′	2	7′-11″	4′-3″	4′-7″	1310	1570
3′	10′	2	9′-9″	4′-3″	5′-4″	1600	1920
4′	8′	3	8′-1″	5′-5″	5′-0″	1490	1790
4′	10′	3	9′-11″	5′-5″	5′-9″	1760	2110
4′	12′	3	11′-9″	5′-5″	6′-6″	2640	3170
5′	10′	5	9′-11″	6′-9″	5′-11″	2740	3290
5′	12′	5	11′9″	6′-9″	6′-9″	3015	3620

*Applies to Single Deck Screen, less drive, mounted at 22½° slope.
†Applies to Single Deck Screen.

SCREENS IN STOCK

Limited number of 4′ x 8′ and 3′ x 6′ single deck Denver-Dillon Vibrating Screens (bare screens) are in stock now, assembled, ready to ship. Additional deck can be added to make 2-deck screen. These screens are subject to prior sale. Phone or wire your order today.

S-5112

Wheels of GOVERNMENT

AMC

AS Viewed by A. W. DICKINSON of the American Mining Congress

THE returning Congress has opened its second and presumably its last session before the November elections. Anxious as the members will be to return to their own districts for the campaign, this session of the 82nd Congress could terminate by the end of June, although the experience of recent years would indicate an adjournment in July or August.

Delivery of the President's message on the State of the Union and of his budget message will start the grinding of the legislative wheels. House members returning from their home districts are expected to give a cool reception to an Administration request for additional tax revenues, and in the early stages of the session, at least, the tendency is more likely to be a call for substantial reductions in Government expenditures.

Capitol Hill comment indicates that Congress will go slow on the President's plan to replace the 64 Collectors of Internal Revenue throughout the country with 25 District Commissioners. Chairman Doughton of the House Committee on Ways and Means has stated that he doubts the plan will be accepted.

Tax Study

The duplication, overlapping and competition in the sources of Federal, State, and local taxes have long been a problem that has troubled tax specialists. This year a House Ways and Means subcommittee will study this subject, and report to the House before the end of the current Congressional session. The staff of the Joint Committee on Internal Revenue Taxation is assembling material for the subcommittee and hearings are to be scheduled at a later date.

Personnel of the tax study subcommittee: Reps. Doughton (Dem., N. C.), Chairman; Cooper (Dem., Tenn.); Dingell (Dem., Mich.); Mills (Dem., Ark.); Reed (Rep., N. Y.); Jenkins (Rep., Ohio); and Simpson (Rep., Pa.).

Renegotiation

Plans of the new Defense Contracts Renegotiation Board are to carry on renegotiation activities through Board regional offices which are to be set up in Chicago, Los Angeles, New York and Washington. There will be a five-man Board in each region, the chairman to be appointed by the main Board under John T. Koehler and one member each to be appointed by the Army, Navy, Air Force, and General Services Administration.

The regulations under which the Renegotiation Act will be administered are now being written. Although there is an exemption for mineral products through the first form suitable for industrial use, it is important that the situation of the mining industry be thoroughly understood by those who write the regulations.

Freight Rates

On December 6 came the announcement that the Interstate Commerce Commission will set a date for hearings on the petition of the railroads to permit the full 15 percent freight rate increase requested last March. In August, increases of 9 percent were granted in eastern territory, with 6 percent in the rest of the country. While the railroads are protesting that rising operating costs make a further increase necessary, any further increase at this time has been protested by the Department of Commerce, Office of Price Stabilization, General Services Administration, and the Tennessee Valley Authority.

St. Lawrence Project

The Canadian Government is pushing along on its drive to construct the St. Lawrence Seaway. The Dominion Government's House of Commons has authorized construction, with or without cooperation by the United States, and has ratified an agreement with Ontario Province for a power development estimated to cost $400 million. This power feature has also been approved by the Dominion's Senate.

The Canadian Minister of Trade and Commerce states that his country would still like to have the United States join in the work, provided the 1941 U. S.-Canadian agreement is ratified by the U. S. Senate early in the current year. The Canadian Minister described the seaway project as involving a channel 114 miles in length from Prescott, Ontario, northeast to Montreal, Quebec, which will be deepened from its present 14 ft to 27 ft. The remainder of the seaway is at least 25 ft deep.

Butte Hearing

Highlight of a hearing held in Butte, Mont., recently by a Senate Interior and Insular Affairs subcommittee, was the demand of labor unions in the mining area that the ceiling price on copper be raised to at least 27½ cents a pound. Senator Murray of Montana, who conducted the hearing, spoke strongly for the mine incentive payment legislation which he sponsored after World War II. Many producers in the area urged more expeditious handling of loan applications and called for increases in the price of copper up to as high as 33 cents

(*Continued on page* 64)

Washington Highlights

CONGRESS: Second session of 82nd Congress convenes.

TAX: Committee studies duplication.

RENEGOTIATION: Regional Boards set up.

FREIGHT: More rate hearings.

ST. LAWRENCE: Canada tackles seaway job.

SMALL MINES: Senate Committee holds hearing.

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High Voltage Cable

No metal armor or lead sheath, yet . . .
There's even greater mechanical and electrical protection in the combination of *neoprene jacket* and *butyl insulation.*
Together they provide:
Unequalled protection from impact, crushing, twisting and abrasion.
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WIRE AND CABLE

With the *Defense Agencies*

By HARRY L. MOFFETT

TOP mobilization planners continue to express concern over shortages in vital materials needed to spur defense and defense-supporting production in the next few months. Official statements from the Office of Defense Mobilization and the Defense Production Administration warn of new cutbacks in metals for civilian products and for non-essential construction, so that more can be channeled to the burgeoning defense program. New and sharper restrictions are expected to be placed on the manufacture of a wide range of consumer goods.

In process of development also is a plan under which the military would be directed to place contracts in "distressed areas," where unemployment has been created due to cuts in civilian production.

While deep slashes are planned for consumer goods, officials of agencies charged with sparking mineral and metal production are doing their utmost to see that the mining industry and its allied equipment manufacturers receive the necessary materials, both to maintain existing production and expand mine output.

The Office of Defense Mobilization has been strengthened by the appointment of John C. Kinnear, retired vice-president of Kennecott Copper Corp., as an assistant to Defense Mobilizer Charles E. Wilson in charge of metals and minerals.

DMPA Expands Activities

The Defense Materials Procurement Agency has created a new Foreign Expansion Division, headed by Charles E. Stott, former director of the ECA Strategic Materials Division. This ECA division and its personnel have all been transferred to DMPA. The new DMPA division is responsible for the agency's operations in Mexico, Central and South America, and all other free countries of the world except Canada. Expansion of foreign mineral properties, either through loans or through guaranteed price contracts, is under its supervision.

The over-all organization of DMPA is shaping up so that matters pertaining to programs and requirements, priorities and allocations, manpower, access roads, purchases and loans can be given more speedy attention than heretofore.

The top minerals agency has also taken steps to insure an increase in the output of copper, by announcing that it is ready to negotiate over-the-ceiling contracts with operators of presently producing high cost domestic mines. DMPA said the action was necessary to even maintain the domestic production of copper at its present level, because certain producers are unable to operate under the existing ceiling price of 24½ cents a pound. The agency stated that it was already negotiating with nine mines whose annual output is about 16,000 tons.

In another move to bring in added copper production, DMPA signed an agreement with the American Smelting and Refining Co., underwriting new production of 197 million pounds of the metal over a 5½-year period. The company will expand its Silver Bell mine facilities in Pima County, Ariz., with a $17 million development. Under terms of the agreement, the Government will take up to 177 million pounds out of the first 197 million pounds produced, if the company cannot sell it at 24½ cents a pound f.o.b. Connecticut Valley.

To assure a further increase in the domestic production of zinc, DMPA advanced $45,000 to the MacArthur Mining Co., for expansion of the company's mining facilities near Baxter Springs, Kans. The company is expected to use the funds to double present production of 325 short tons of ore per day.

DMPA has also stated that increased production of high grade mica from domestic mines is planned for early 1952 under terms of a Government-guaranteed purchasing program which is yet to be announced. The agency has likewise met with manganese producers in an effort to develop a program to stimulate domestic production.

Basic Materials Producers Receive TA's

Producers and fabricators of basic materials received almost 65 percent of the $10.6 billion worth of rapid tax amortization certificates issued by DPA through October 19.

Largest grants went to the steel industry for plants and mills, with primary aluminum production second. Other basic material industries granted rapid amortization include: Iron ore, 14 certificates for $111 million; copper ores, 5 certificates for $23.8 million; lead ores, one certificate for $471,000; zinc ores, 3 certificates for $10.2 million; lead-zinc ores, 3 certificates for $4.5 million; bauxite and other aluminum ores, 6 certificates for $24.4 million; molybdenum ores, one certificate for $7 million; tungsten ores, one for $75,000; titanium ores, 2 for $13.9 million; uranium-radium-vanadium ores, 2 for $2.5 million; anthracite coal, 8 for $6 million; bituminous coal, 12 for $9.6 million; and sulphur, 7 for $6.65 million.

The tax amortization grants also included: Primary copper, 2 for $9.4 million; primary lead, 3 for $298,000; primary zinc, 7 for $5.6 million; other primary nonferrous metals and alloys, 10 for $9.4 million; and primary metal industries not otherwise classified, 62 for $55.4 million.

Meanwhile, the Defense Solid Fuels Administration has announced that metallurgical coal capacity will be increased by about nine million tons and coke capacity by about 3,900,000 tons after completion of projects for rapid tax amortization, approved through mid-December by DPA. DSFA said that 29 projects in eight states, totalling about $48 million, have been approved for the increased production of metallurgical coal.

DPA Reports on Basic Materials

In its latest "List of Basic Materials and Alternates," the Defense Production Administration emphasized that in the face of greatly increasing demands for materials for defense production, most raw materials, with the exception of certain metals, continue at a generally stabilized level of supply. DPA said that metals in tighter supply are copper, nickel, cobalt, tin, lead and zinc.

While DPA continued its drive to get industry to use substitutes for metals such as copper and zinc, mining industry officials indicate that the situation is greatly overemphasized and that only a small share of the production of these metals is going into direct defense production at this time.

The production agency, meanwhile, has overruled objections of Interior Secretary Chapman and the Justice Department and approved the plan of the Anaconda Copper Mining Co. and the Harvey Machine Co. to build facilities at Kalispell, Mont., to produce 72,000 tons of aluminum metal annually.

Coal, Coke to Get Material

The Defense Solid Fuels Administration has allotted controlled materials to 39 authorized coke oven and coal chemical construction projects for the first quarter of 1952. The projects total more than $190 million and constitute one of the largest coke oven construction programs in the industry's history. When completed, they will provide 8.4 million tons of coke annually, although a large part of this capacity will replace old ovens.

Allotments of controlled materials for the coke oven construction program were based on the following: Steel, 18,496 tons; copper and copper base alloys, 400,000 pounds; and aluminum, 70,000 pounds.

Revamp Wage-Salary Rules

Late in December the Wage Stabilization Board issued two regulations (Nos. 19 and 78) setting forth a largely self-administering policy for the establishment of new health and welfare plans or the modification of old ones. Under the regulations, employers may establish new health or welfare plans or improve existing ones without prior WSB approval if they meet certain "review criteria" laid down by the Board. These criteria cover such matters as temporary disability benefits, hospital expenses, surgical and medical expenses. Plans falling within the terms of the regulations become effective 30 days after being filed with the Board if no negative action is taken within that period.

The Board has also amended its regulations to eliminate the reporting requirements for increases granted under the 10 percent "catch-up" formula and under cost-of-living provisions. Employers now granting these increases are simply required to keep "appropriate records." Previously they had been required to file written reports of adjustments in compensation.

Meanwhile, the Salary Stabilization Board incorporated into one regulation the principal rules pertaining to the pay of salaried workers. No substantive changes were made in doing this but much of the language of prior regulations was simplified.

Capehart Amendment Applied

The Office of Price Stabilization has finally issued a General Overriding Regulation No. 21, which applies the Capehart amendment of the Defense Production Act to a wide range of raw materials. It had already been made applicable to general manufacture and machinery regulations. The amendment as it pertains to raw materials is entirely optional. No one has to price under it.

In announcing GOR 21, OPS said that the extractive industries, such as mining and crude oil production, are included under it. The agency said it had no other choice than to allow applications for adjusted ceiling prices from these industries. Closely following the Capehart amendment, GOR 21 tells the applicant that he can calculate his new ceiling for each commodity by (1) finding his base period price—the highest price received in the period January 1-June 24, 1950; (2) finding his base date—the last date before June 24, 1950, on which a sale was made at the base period price; and (3) adjusting the base period price by adding or subtracting increases or decreases in costs of materials, labor and overhead between the base date and July 26, 1951.

The pricing agency also revised its Ceiling Price Regulation 30, relating to machinery manufacturers, to provide that in calculating overhead adjustment factors under the Capehart amendment, a manufacturer may do so for his entire business without first calculating dollars and cents overhead factors for each commodity he makes.

OPS has extended the expiration date of Supplementary Regulation 13 to the General Ceiling Price Regulation, which applies to producers of coke, coal chemicals and coke oven gas, from December 31, 1951, to February 29, 1952.

In other pricing actions, OPS exempted from price controls all sales of domestic antimony ores and concentrates and virtually all commercially usable acid grade fluorspar. It permitted price boosts for wooden mine materials produced and sold in Michigan, Minnesota, Wisconsin, Virginia and West Virginia.

Wheels of Government

(*Continued from page* 61)

a pound in order that they might carry on their operations.

Following the hearing, Senator Murray expressed confidence that the facts developed would form the basis for a change in procedures on applications for participation in the defense minerals program. He pledged that if changes in the basic law are found necessary he would sponsor such changes. He explained, however, that he believes the Defense Production Act, as amended, is sufficiently broad to cover the situation adequately and that a streamlining and centralization, based on a grasp of the facts of mineral production, is what is needed. The Senator said a hearing will be held later in Washington at which defense minerals agencies officials will be asked to testify on policies and procedures.

AMC Personals

Effective January 1, **H. C. Livingston** resigned his position as vice-president of operations of the Union Pacific Coal Co. to take a similar position with Truax - Traer Coal Co.

Livingston joined the Union Pacific Coal Co. in 1927 as a draftsman and general engineer. In 1937, he was advanced to assistant chief engineer, to chief engineer in 1940, to general superintendent in 1941, to assistant general manager in 1944, and to vice-president of operations in 1946.

C. Howard George, vice-president of the New Jersey Zinc Co., has been elected a director of the company succeeding William Woodward who has resigned.

At the same time, **Edward E. Schwegler** was elected company comptroller succeeding **Frederick B. Baxter**, who will retain his title as vice-president.

Several hundred former business associates and friends paid tribute to **J. B. Warriner**, former president of the Lehigh Navigation Coal Co., at a testimonial dinner in Lansford, Pa., November 29. Warriner recently completed almost 40 years of service with the "Old Company," having become affiliated with it as chief engineer in 1913. He is a former member of the Board of Directors of the American Mining Congress and at one time was its president.

Anton Gray, vice-president of Kennecott Copper Corp., has announced the appointments of **James Boyd** as exploration manager and **Georges Ordonez** as chief geologist of the corporation.

Boyd resigned his position as director of the U. S. Bureau of Mines to join the Executive Staff of Kennecott on October 16, 1951.

Ordonez spent several years in Central America with American oil companies before joining the exploration staff of Kennecott in 1945. In his new assignment, he will supervise the field geological staff of the company.

Shortly thereafter, Boyd announced that **Lowell B. Moon**, chief of the Minerals Division of the U. S. Bureau of Mines, will join the exploration staff of the corporation. He also reported the promotion of **L. S. Breckon** to the position of district geologist with headquarters in Sydney, Australia.

Charles E. Dunlap, president of Berwind-White Coal Mining Co., has been named to the Bituminous Coal Institute's Board of Directors. He fills the vacancy on the Board left by the resignation of **N. L. Newhall**, president of the Berwind Fuel Co., who has retired from active participation in business.

Cyprus Mines Corp. has announced the appointment of **Evan Just** as vice-president. Under his direction, the company will expand its exploration activities and personnel in both the domestic and foreign field. Just has been editor-in-chief of *Engineering and Mining Journal* since 1944 and on the editorial staff of that publication since 1942. In 1948, on leave of absence, he was organizer and director of the Strategic Materials Division, Economic Cooperation Administration.

EVAN JUST

R. H. Ramsey replaces Just as editor of *E. & M. J.* Ramsey, after finishing school, worked in a Mexican gold mine, on a gold dredge in Colombia as metallurgical engineer and in a similar position for the Pan American Engineering Co. in Berkeley, Calif. He joined the staff of *Engineering and Mining Journal* as assistant editor in 1942 and rose to the position of executive editor, the post he held before his recent promotion.

R. H. RAMSEY

The Lehigh Navigation Coal Co. has announced the resignation of **Jerald S. Hanks** as comptroller. He resigned to become comptroller of Pierce Management, Inc., mining consultants, at Oliveri, Greece.

The Utah Mining Association has elected **R. D. Bradford**, general manager, Utah Department, American Smelting Refining and Mining Co. as president. He succeeds **W. C. Page**, vice-president and general manager in charge of western mining operations, United States Smelting Refining and Mining Co.

R. D. BRADFORD

Miles P. Romney, former executive vice-President of United States Smelting Refining and Mining Co. in Salt Lake City, has been named secretary-manager of the Utah Mining Association. The new appointment was effective January 1. **Walter M. Horne**, who has been serving as acting secretary-manager, resumed his duties as assistant manager of the Association at that time.

M. P. ROMNEY

T. A. Lynch has been named director of the Aluminum and Magnesium Division, NPA, by Administrator Manly Fleischmann. According to an earlier announcement from the same office, **Walter H. Wiewel** was appointed assistant administrator of NPA, in charge of the Metals and Minerals Bureau, to succeed **Norman K. Foy** and **S. B. Coolidge**.

J. P. Routh, president of The Pittston Co., has announced the election of **J. M. Miller** of Beckley, W. Va. as president of Lillybrook Coal Co., Amigo Smokeless Coal Co., and E. C. Minter Coal Co., with mines in the Winding Gulf District of West Virginia. Miller will continue as president of the Raleigh Smokeless Fuel Co., which markets the output of the

Lillybrook, Amigo and Minter mines.

At the same time it was announced that **V. M. Barnard** had been elected vice-president in charge of operations of Lillybrook and its affiliated mining companies.

Robert S. Palmer, executive director of the Colorado Mining Association, has been named a consultant to the Defense Materials Procurement Agency.

On December 31, **John Paul Dyer** retired as vice-president and director of Phelps Dodge Refining Corp., a subsidiary of Phelps Dodge Corp. Before coming to Phelps Dodge in 1929, Dyer was with Chile Copper Co., Chuquicamata, Chile. In 1930 he was in charge of construction of the Copper Refinery built in El Paso, Tex., for the treatment of Phelps Dodge copper.

Vernon O. Murray was recently named vice-president of operations of the Union Pacific Coal Co. He succeeds H. C. Livingston, who left the company to take a similar position with Truax-Traer Coal Co., January 1.

V. O. MURRAY

The appointment was announced at the Union Pacific Coal Co.'s headquarters by I. N. Bayless, president. In addition, Bayless announced the promotions of **John B. Hughes** to replace Murray as general manager and of **Charles Grosso** to succeed Hughes as general superintendent.

The M. A. Hanna Co. announced recently that **L. W. Spang** has been appointed secretary of the company, the post left vacant by the late William C. Scott. A graduate of Marquette University Law School, Spang joined the Hanna organization in June 1950, as assistant counsel.

The Truax-Traer Coal Co. has announced the appointment of **Charles E. Walker** as general manager of operations of their Eastern Division, with headquarters at Kayford, W. Va.

Walker a native West Virginian, started in the coal business in 1920 and advanced through several supervisory positions to be made general mine foreman of the Island Creek Coal Co. in 1928. In 1933, he became mine superintendent of Island Creek; in 1940, general superintendent of the Pond Creek Pocohontas Co. and, in 1944, general manager of the same Company. In 1948, he was appointed general manager of the Island Creek Mines, with headquarters at Holden, W. Va., and held this position until the time of his resignation in April, 1951.

John C. Kinnear, vice-president of Kennecott Copper Corp., retired December 31, 1951.

Associated with Kennecott interests for the past 41 years, Kinnear was appointed general manager of the Nevada Mines Division in 1927. He held this position until his election to a vice-presidency of Kennecott in 1945. Early in January it was announced that Kinnear had been named assistant to Defense Mobilizer Charles E. Wilson.

J. Bruce Climmer, chief of the U. S. Bureau of Mines' Southwest Experiment Station, Tucson, Ariz., has succeeded **S. R. Kimmerley** as head of the agency's Intermountain Station at Salt Lake City.

Herman J. Gemuenden has been appointed director of industrial relations for the mining operations of Oglebay, Norton and Co. in the Lake Superior region.

Harold L. Beattie has been appointed production engineer of the coal operations of Elk River Coal and Lumber Co. at Widen, W. Va. He has had mining experience with Eastern Gas and Fuel Associates, Davis Coal and Coke Co., and Warner Collieries. In his new position Beattie has jurisdiction over mine planning and mine policy.

—*Obituaries*—

Hugh McLeod, 68, former Wyoming state mine inspector, died November 19 of a heart ailment. He had served as mine inspector from 1930 until three years ago.

John Samuel Lloyd, Sr., 88, pioneer in the coal industry in the Birmingham, Ala., district died December 1 at his home. Mr. Lloyd came to Birmingham from Scranton, Pa., in 1884 and was in coal mining until his retirement 25 years ago.

Urie Eugene Brown, Bunker Hill & Sullivan Mining and Concentrating Co. mining engineer, died in Kellogg, Utah, recently. Born in Shedd, Ore., Mr. Brown was chief engineer at the Bunker Hill Mine for many years until his retirement about a year ago.

Tracey Bartholomew, research engineer, died in Pittsburgh, Pa., December 10. Born in Austin, Texas, in 1884, Mr. Bartholomew was, at various times, a construction engineer for Federal Lead Co., designing and testing engineer of the Nevada Consolidated Copper Co. and general manager of the Alkali-Proof Cement Division of Portland Cement Co.

He was a fellow in the Mellon Institute of Industrial Research from 1921 to 1939; manager of Duquesne Slag Products from 1929 to 1940 and a construction engineer since 1940.

Albert W. Ward, retired General Coal Co. official, died recently at his home in Narberth, Pa. Born in Donaldson, Pa., in 1867, Mr. Ward was connected with the coal industry for over 60 years.

He entered the coal business as the first office employe of Dr. J. S. Wentz at Eckley, Pa., in 1884. Until 1903 he was affiliated with the Wentz interests in the anthracite region. When General Coal Co. was formed to handle the sales of coal production of the Wentz interests, Mr. Ward was made auditor, the position he held at the time of his retirement.

Morton F. Leopold, 68, chief of the U. S. Bureau of Mines Motion Picture Section passed away in his sleep December 11. Mr. Leopold was a veteran of 46 years' service with the Government; 41 with the Bureau of Mines. He was one of the pioneers in the safety work of the Bureau and last year was awarded the Interior Department's Distinguished Service Award. It was he who conceived and brought to its present enviable status the Bureau's library of motion picture films on all phases of mining. He directed and produced many of the outstanding films himself.

Frederick W. Leamy, New York City, for many years senior vice-president of The Hudson Coal Co. and a director of Anthracite Institute, died recently after a long illness. He was 65 years old.

Mr. Leamy resigned his position with the Hudson Coal Co. in December 1946, but continued as executive vice-president of The Delaware and Hudson Railroad until his retirement from business in October 1949. While active in the anthracite industry, Mr. Leamy served on many of its most important committees, and was chairman of the Anthracite Producers Advisory Board.

Michigan Alumni Meet

The New York section of the Michigan College of Mining and Technology Alumni Association are to be hosts at a dinner for all alumni, friends of the college, their wives and guests on Tuesday, February 19, in the Sky Top Room of the Statler Hotel in New York City. This meeting is to be in conjunction with the annual meeting of the AIME. The guest speaker will be Dr. Grover D. Dillman, president of the college.

Set Safety Mark

A new mark in safe coal production has been set by the Island Creek Coal Co. of Holden, W. Va. From July 1950 to November 13, 1951 the firm produced 10,000,000 tons of coal without a single fatality according to a report by H. H. Barber, general manager, and C. E. Linkous, director of safety. The output came from ten mines.

Recognize Mine Service

There are 234 Eastern Gas and Fuel Associates mine employes who in 1951 completed 20 to 50 years with the coal-mining organization or its predecessors, according to D. C. Stewart, manager, industrial relations. One man among the 234 has completed 50 years of service, 10 have 40 years, and there are 22 with 30 years, 82 with 25 years, and 119 with 20 years.

A total of 211 are mine workers, including the 50-year veteran and all but one of the 40-year veterans. Only 23 are officials or office workers.

The veterans will be honored at meetings to be held soon throughout the districts where EGFA mines are located. Jeweled pins or buttons bearing numerals for the years of service will be presented to each man.

Coal Research Advances

A contract for the construction of a large pilot plant has been awarded to the Chemical Plants Division of Blaw-Knox Co. by the Research and Development Division of Pittsburgh Consolidation Coal Co. To be built at the coal company's research center at Library, Pa., the pilot plant is to be used for the partial conversion of coal, employing a newly developed low-temperature carbonization process.

Operation of the pilot plant will: (1) Provide cost and design data for a commercial plant; and (2) furnish production of sufficient quantities of liquids to permit commercial evaluation of the many chemicals and special carbons obtained by the process. The carbonization process itself has been proved, according to the company, by more than 200,000 research man-hr

A demonstration-size pipeline project has been installed near Cadiz, Ohio at the Hanna Coal Division of Pittsburgh Consolidation Coal Co., and operated by the company's Research and Development Division. In the foreground is a section of the 12 inch line prior to being buried underground below the frost line. The movement of coal in the background of this photo is from left to right during processing for pipeline transportation. The coal is picked up by conveyor and brought to the crusher building to be prepared to a specific size depending upon experiment requirements. From the crusher building it travels by conveyor to the slurry preparation plant on the far right where the crushed coal is mixed with water and piped into the lines. Return lines send it back to the slurry preparation building where the slurry continues to make the rounds through the pipes. From 7000 to 9000 tons of coal are moved through the system daily.

and months-long operation of a smaller pilot plant.

When partially converting coal by the company's low-temperature carbonization process, each ton of coal produces 0.7 ton of high-Btu solid fuel called "char," about 37 to 40 gal of tar liquid and some gas. The char product serves as a high-grade boiler fuel, and the liquid, when refined by processes developed by the company, yields low-boiling tar acids, creosotes or feedstock for making carbon black, and electrode carbons. The tar acids are used as chemicals and as intermediates by the plastics industry.

The contract calls for an immediate start on plant engineering, with construction to begin early in the spring. Completion is expected during the third quarter of 1952.

Coal Men Honored

Henry F. Hebley, research consultant, and Earl C. Payne, consulting engineer, Pittsburgh Consolidation Coal Co., were elected Fellows of the American Society of Mechanical Engineers at the recent meeting of the directors of this professional society.

H. F. HEBLEY

The citation to Mr. Hebley honors him for his work in the fields of atmospheric and stream pollution. His "early conception of the real factors affecting atmospheric pollution has brought about the recent modern scientific interest and approach to solution of the problem." He is also credited with encouraging a scientific approach toward the treatment of water-borne industrial trade wastes. Mr. Hebley's work in these two fields, in the view of the society, has contributed most to the profession and "significantly to the public welfare."

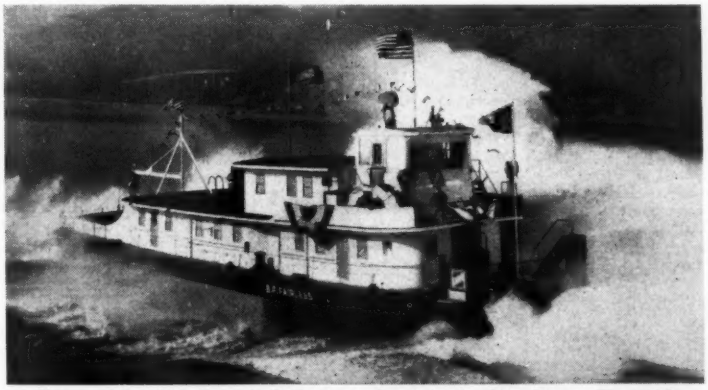
Mr. Payne was honored for his contributions to fuel performance and for his "outstanding engineering work" in organizing and directing group "programs on research and development to advance the art and profession of fuel engineering, including both technical and economic phases." He is acclaimed for such work as organizing the Great Lakes Air Pollution Abatement Program to reduce smoke from lake vessels, and for a number of activities in Allegheny County and elsewhere to reduce locomotive smoke and develop cinder collection and ash disposal systems. Mr. Payne is presently leading a national movement, the society reports, to provide engineering advice to consultants and owners of small steam plants, so that they may use coal more efficiently and economically.

E. C. PAYNE

Iron Mine Closes

Hanna Coal and Ore Corp., a subsidiary of the M. A. Hanna Co., has announced that operations have ceased at the Clifton mine, De Grasse, N. Y.

The iron mine has been operated both as an open pit and underground mine since 1942. Developed ore has been exhausted, and there are not enough ore reserves to justify further development.



The new diesel towboat, B. F. Fairless, slips into the Ohio River. The 108-ft vessel will replace a 174-ft steam sternwheeler, the Clairton, in United States Steel Co.'s river fleet. The Clairton has transported nearly 28,000,000 tons of coal and other bulk products on Pittsburgh district rivers since it was built in 1920

Trackless Mining

(*Continued from page* 33)

tween each block of four rooms on each side to permit sealing of the mined out area, if necessary.

The full 16 ft of coal is mined as the room is advanced and the coal in the pillar is taken out by pocket and stump method on the retreat. Timbering consists of 20-ft crossbars on five-ft centers in rooms and 16-ft crossbars on five-ft centers in the pillar lifts and is installed by two men and a timbering machine.

In cutting and drilling for face preparation in the room, the face is first undercut and then horizontally sheared eight ft above the bottom. Fourteen holes are drilled and loaded with three or four sticks of powder. Each prepared face will produce approximately 120 tons of coal and production from room and pillar work is 600 tons per shift.

The labor required to maintain a complete and continuous cycle of operation at Stansbury No. 1 mine is:

1	Unit Foreman
1	Machine Runner
1	Machine Helper
2	Timbermen
2	Drillers
1	Joy Runner
1	Joy Helper
2	Shuttle Car Operators
1	Loaderhead Man
2	Motormen
1	Repairman
15	TOTAL

The timbermen and the repairman perform dead work such as timbering, extension of power lines, and maintenance and cleaning of the belt.

Conclusions

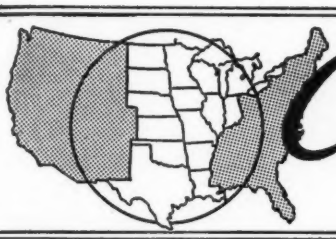
Principal advantages of the panel belt system can be listed as follows:

(1) Elimination of tracks, trolley and ventilating doors or overcasts in three entries.

(2) Reduction of the amount of strike development or narrow work.

(3) Labor savings in room and pillar work due to more efficient operation.

This system of mining at Stansbury No. 1, has produced savings of 33 cents per ton for the 700,000 tons removed from each panel. Capital outlay for equipment is approximately $162,000, bringing about an additional depreciation charge of 4.5 cents per ton, based on a 15 year period and 200 working days per year. An additional power cost of five mills per ton for the operation of the belt must be charged, making a net saving of 28 cents per ton for the new method over the old system of mining.



Central States

Iron Ore Shipment

A total of 89,092,012 gross tons of iron ore was shipped down the Great Lakes during the 1951 shipping season. This represents an increase of 10,886,420 tons over 1950 shipments.

A record "peacetime" haul, it betters the previous peacetime record of 82,937,192 tons, set in 1948, and compares with the all-time high of 92,076,781 tons carried in the war year of 1942.

Reopen Coal Mine

An agreement between the mine labor group, new capital interests and the Bell and Zoller Coal and Mining Co. has led to the reopening of the company's mine No. 7, Staunton, Ill. The mine was to be made available by the Zeigler Coal Co. on a royalty basis. Members of the Progressive Mine Workers of America Local No. 18 were to provide ten days of free labor for the reopening for which they will be reimbursed later, if profitable operation is achieved. The mine was closed last August.

Coal Dock in Operation

The Kellogg Dock Co., owned jointly by the Moffat Coal Co., Sparta, Ill., and the Republic Coal and Coke Co. of Chicago, recently loaded the first barge of coal at its new Mississippi River dock. Located at Kellogg, Ill., about 60 miles south of St. Louis, the dock site was selected to allow loading operations during extremes of low water to a 30-ft flood stage.

Purchase Lead Properties

The Standard Mining Corp. has acquired leases on a large acreage of lead properties in the vicinity of Joplin and Aurora, Mo. The Standard properties are all in charge of Jack Gilbert who has had many years experience as a mine superintendent in this district.

There are five churn drills in operation, and it is planned to open a strip pit in the near future on the McBride property in Leadville Hollow. This was one of the richest of the oldtime mines. Others that were formerly heavy producers from this tract were: the Trimore, Lizard, and Boulder mines. These were all hardrock mines but comparatively shallow. On the Fourcorners tract the oldtimers were: Lucky Joe, Henderson, Omaha, Excelsior and Gouveneur.

Hanna Plans Winter Work

Stripping at a number of M. A. Hanna Co. mines on the Mesabi and Cuyuna ranges will continue during the winter. An estimated 17,000,000 cu yd of material will be removed from ore bodies while ore shipments are at a standstill.

Construction of the heavy-media plant at the Mesabi chief mine, Nashwauk, Minn., will be continued with the expectation that the plant will be in operation by May 1. The screening and crushing plant at the Mesabi chief pit, Keewatin, Minn., will be taken down and re-erected on a new site at the mine.

Aluminum Plant Opens

The Kaiser Aluminum & Chemical Corp.'s new plant on the Mississippi River at Chalmette, La. was opened in mid-December.

It is expected to have a capacity of approximately 200,000 tons per year when finished, in 1953. Originally scheduled to have a capacity of only 200,000,000 lb of primary aluminum by mid-1952, the new eight potline facility's output was doubled as a result of a contract between the company and defense authorities.

Alumina for the new plant will come by rail from Kaiser's Baton Rouge works, about 80 miles up the Mississippi from Chalmette. Raw materials for the Baton Rouge plant comes from the Guianas in South America. Additional supplies will also come from the firm's new Jamaica, British West Indies, bauxite reserves which are scheduled to begin quantity shipments some time in the third quarter of 1952.

Open Oklahoma Coal Mine

A strip mine, the Bluebonnet, has been recently opened by the Leavell Coal Co. of Tulsa, Okla. at Checotah, Okla. The new mine has a potential production of more than 200,000 tons annually. A seven-cu yd dragline is being used at the present time to mine the 30 in. seam, which underlies 35 to 40 ft of overburden.

Position Open

Strip Mine Superintendent. Location—West Kentucky. Must be experienced in large stripping machinery, washing plants, and be thoroughly capable of handling construction. Address all inquiries to Box 250 in care of this publication.

Miners Pay Raised

A four-cent hourly wage increase and a bonus clause have been negotiated for workers of the Baroid Sales Co., which mines bentonite near Belle Fourche, S. D., making pay there now $1.30 per hour.

Acquire Lake Vessel

Acquisition from The Maritime Administration of a C-4 vessel, which will be converted for bulk freight service on the Great Lakes, has been announced by Hanna Coal and Ore Corp. and the Sand Products Corp. of Detroit.

The vessel will be owned by the Hansant Steamship Corp., a newly-formed company owned jointly by Hanna Coal and Ore and Sand Products. It will be operated by Hanna as agent, and is expected to be ready for the 1952 shipping season.

Now known as the *Marine Robin*, the ship was built in 1944 by the Sun Ship Building and Dry Dock Co. at Chester, Pa. It has overall length of 522 ft, beam of 71 ft 6 in., molded depth of 43 ft 6 in. and a power plant of 9000 hp.

Apprentice Joe to G.I. Joe

Procedure to be followed by an apprentice and his employer when the apprentice leaves to join the armed forces is clarified in a brief, illustrated pamphlet, issued by the U. S. Department of Labor's Bureau of Apprenticeship. It explains the records to be prepared for use by an apprentice when reporting for active duty and also for his use when he returns from military service so that he may be assured of reemployment rights.

Copies of this pamphlet may be obtained free of charge by communicating with the Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C. When requesting copies, please mention the publication in which this notice appeared.

File Uranium Claims

So far a total of 23 claims have been filed for uranium ore in an isolated canyon 10 miles north of Edgemont, S. D.

Iron Experiment Ends

The State of Minnesota has ended a five-year experiment on transforming low-grade ore, found in the state, into iron powder for commercial markets. In 1946, Continental Machines, Inc. built the plant at Aurora, Minn. and later operated it using the Firth Process to make powdered iron from low grade ores. The process was developed by the late Charles V. Firth of the University of Minnesota, Mines Experiment Station. It had been successful in the laboratory and the plant was built to prove the success of the process on a commercial basis.

Continental operated the plant until August 1950 when it was announced the process was not commercially feasible and that further experimental work had been stopped. A company spokesman said both the state and the company were satisfied that iron powder could not be produced by the process on a commercial basis.

On the left is shown the portal of a 70-year-old lead and zinc mine near Mifflin, Wis., now producing 250 tons of ore a day. An International TD-9 tractor is utilized to load ore into trucks (right) which haul it to a crushing plant at the mine portal, a quarter of a mile away. Operated by Mifflin Mining, Inc., the mine is located on a 1000 acre lease 3½ miles northwest of Mifflin. The mine was first opened in 1882 but has been idle for many years

Annual Members Meeting

(*Continued from page* 43)

Mines; Charles W. Connor, Administrator, Defense Solid Fuels Administration; Harold A. Montag, Director, Mining Machinery Division, NPA and Director of the Mining Division, DMPA; and C. O. Mittendorf, Acting Administrator, Defense Minerals Exploration Agency. He also asked John McCabe of the Hercules Powder Co to stand and receive the warm good wishes of the members on the occasion of his retirement.

An amendment to the By-Laws increasing the maximum number of Directors from 21 to 24 was unanimously approved. Marshall Havey presented the report of the Nominating Committee, and the following were then unanimously elected to serve for the terms indicated: C. J. Potter, president, Rochester and Pittsburgh Coal Co. as Director for a one-year term; R. A. Hummel, president, Lone Star Cement Co., and Paul B. Jessup, vice-president, Day Mines, Inc., to serve for a two-year term; and the following eight Directors for a three-year term: Horace M. Albright, president, U. S. Potash Co.; J. M. Bowlby, Chairman of the Board, Eagle Picher Co.; Worthen Bradley, president, Bradley Mining Co.; John P. Courtright, executive vice-president, Marion Power Shovel Co.; Charles R. Cox, president, Kennecott Copper Corp.; R. T. Elstad, president, Oliver Iron Mining Co.; C. A. Garner, vice-president, Jeddo-Highland Coal Co.; and George H. Love, president, Pittsburgh Consolidation Coal Co.

With the new Directors duly elected, a vote of appreciation was extended to Messrs. Arthur E. Bendelari, J. C. Kinnear, M. L. McCormack, Harry M. Moses and Jesse B. Warriner, retiring members of the Board, for their able service and their devotion to the best interests of the mining industry and the American Mining Congress. President Young then adjourned the meeting.

Immediately following the business meeting, the Board of Directors gathered in an adjoining room. At this meeting they elected Howard I. Young, president, American Zinc, Lead & Smelting Co., President for another term. Worthen Bradley, Andrew Fletcher and William J. Jenkins were elected vice-presidents, and Julian D. Conover, executive vice-president and secretary.

Western States

Colorado Miners Will Meet

The Colorado Mining Association will hold its annual meeting at the Shirley-Savoy Hotel in Denver on January 31, and February 1 and 2. Scheduled for February 1 is the well-known Gold and Silver Banquet, while the Sowbelly Dinner and the ladies' Sour Belle Dinner will be held on February 2.

Designed to assist all segments of the mining industry, the meeting will include regional tungsten, manganese and uranium programs, a fluorspar section, and conferences on all other metals. Special attention is to be paid the problems of the prospector and developer.

Yuba River Redredged

Redredging of areas, worked many years ago by less efficient dredges, is proceeding at the property of Yuba Consolidated Gold Fields in the Yuba River field near Marysville, Calif. Considerable acreage has been made available for dredging by diverting the Yuba River from its main channel, and much virgin ground remains to be worked. Yuba River placers are deeply covered with debris washed down from hydraulic mines in adjacent hills and gulches during early gold mining.

Start Exploration Project

According to a recent report, Silver King Coalition Mines Co. has commenced work in the Park City district on three exploration projects. They involve more than 8600 ft of drifting, raising, cross-cutting and diamond drilling during the next two years, with the objective of discovering of new reserves of lead-silver-zinc ores.

An adit is being driven into the hill about the level of the collar of the Thaynes shaft. The Comstock vein will be cut and drifted on for 2100 ft. At three places, it is proposed to crosscut off the drift and raise in search of ore.

Work will commence on another project from the 200 ft level. It includes 1000 ft of diamond drilling and 2650 ft of drifting and raising to find intersection of the Comstock and Odin veins. Location of the ore-bearing sections of the Odin vein is main objective of this project.

The third project includes some 500 ft of drilling and 215 ft of raises from the 1100-ft level up to the 900-ft level. This work will dip into the joint ground which Silver King and Park Utah Consolidated Mines Co. now are developing at depth.

Another part of this project calls for entrance into the Silver King ground at the 900-ft level and raises to the 850-ft level. This will require 700 ft of work on the 850-ft level and 550 ft of work on the 900-ft level, not including 60 ft of raises.

Noonday Mine Opens

Operations have begun at the Noonday Mine, 56 miles south of Wells, Nev., in the Ruby Valley. A crew of 12 miners is at work on the lead-silver-zinc property. First developed in 1910, it is now operated by Noonday Mines, Ltd.

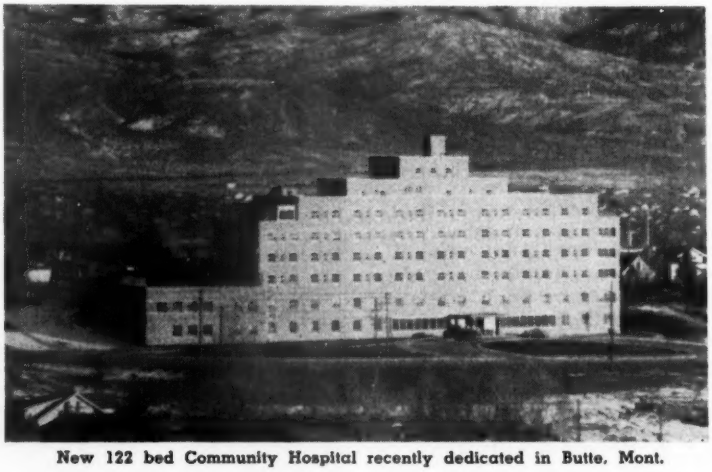
Lucky Friday Develops

Lucky Friday Silver-Lead Mines Co., Wallace, Idaho, has developed, a vein of milling grade silver-lead ore on the 2000-ft level for a distance of 250 ft and still has a full face of ore in both east and west headings. The vein shows four ft of high grade ore on the foot-wall side and the same width of milling ore on the hanging-wall. The company is now producing 100 tons of ore per day which is being treated at the Golconda custom mill. It also plans an extensive prospecting program from the 2000-ft level.

Great Butte Future Forecast

Enlarged operations at the Butte, Mont. property of Anaconda Copper Mining Co. were predicted recently by Cornelius F. Kelley, company chairman, in his address in Butte at the dedication of the new 122-bed Community Hospital.

In the course of his address Mr. Kelley said, "Today, and for years past, every foot of underground development necessarily made in the drainage, haulage and ventilation drifts and crosscuts through what was formerly considered barren country rock is carefully assayed and accurately recorded. There are some 30,000 ft of these passages driven each year. I assure you that it takes little imagination to predict that Greater Butte Project will be but the precursor of still greater projects in time to come. For the hill contains mineral wealth that will not only enable it to maintain its position as a major copper producer, but will, without any doubt, enable it to become the greatest producer of zinc and manganese in the United States.



New 122 bed Community Hospital recently dedicated in Butte, Mont.

"Development of these projects is now under way. They will be brought into realization through the completion of the Alice-Lexington tunnel and its ancillary planned underground workings, and by the bringing into production the treasure we know exists in the old Black Rock-Elm Orlu section of the famous Rainbow Lode."

Open Milling Plant

Mines Management, Inc., is ready to start operating a new zinc-lead milling plant on Sheep Creek, near Northport, Wash. The company recently purchased the old Advance Mine in this new zinc-lead field and has developed a large body of low grade zinc-lead ore.

Install Sulphur Mill

Installation of a second mill unit is progressing at the Black Rock sulphur property northwest of Winnemucca, Nev. The old producer was recently reopened by Black Rock Desert Mineral Co. and equipped with a plant capable of treating 40 tons of sulphur daily.

U.S. to Run Aluminum Plant

Negotiations are under way for the U.S. Bureau of Mines to complete construction of a government-owned experimental aluminum plant at Laramie, Wyo., for recovering alumina and cement raw materials from anorthosite rock and other low-grade aluminous ore. The Bureau of Mines took possession of the Laramie plant on September 28, 1951. It was one of four experimental plants authorized during World War II but was never completed. In September 1950, this plant was declared surplus by the RFC and was made available to the General Services Administration for disposal.

Atlantic Cable Mine Sold

The famous Atlantic Cable Mine near Anaconda, Mont., has been sold to the Canyon Lode Mining Co. of Spokane by the heirs of H. C. Bacorn. The property began as a gold mine in 1867 and during the 80's produced extremely rich ore, one 500-ft area producing $6,500,000 in gold. In later years it has been a copper producer.

New owners plan installation of a modern flotation plant to treat copper-gold ores from the mine and tailings piles left from previous operations. They also plan to rehabilitate the lower shaft levels in preparation for full-scale mining of known ore bodies. A thorough geological examination was made by Canyon Lode to determine if further outcroppings of copper-gold orebodies existed in the vicinity before the property was acquired.

Spokane-Idaho Grows

Operations are being launched by the Spokane-Idaho Mining Co., in the Coeur d'Alene district following approval of stockholders of the Douglas Mining Co., Ltd., in Wallace, Idaho, of a ten-year contract under which the property in the upper Pine Creek Section of that district is to be operated. Frank N. Marr, president of Spokane-Idaho, stated that his company is starting to deepen the inclined shaft 200 ft to about 700-ft vertical depth. Douglas is the third mine added to Spokane-Idaho holdings this year. Expanding in another direction Spokane-Idaho has also acquired a two-thirds interest in Paymaster, Inc., a new company formed to acquire the Paymaster Mining Co. property between Arco and Carey, Idaho.

Plan Hydroelectric Plant

Stockholders of Slate Creek Mining Co. were informed that the company planned to construct a new hydroelectric plant to provide cheaper, uninterrupted power at its new light gold mine in Whatcom County, Wash. It is reported that the new plant would save approximately 58 cents per ton in milling costs when the mill is operating at a 100-ton-per-day rate. The present power plant will be used as a standby.

Uncover Copper Deposit

Preliminary stripping for the next open-pit copper mine in the Globe-Miami district of Arizona has been started by the Copper Cities Mining Co., subsidiary of Miami Copper Co. More than 100 men, working 3 shifts

daily, are already employed in the work.

The Copper Cities properties are located in the Sleeping Beauty Mountain district, three miles northeast of Miami, and are estimated to contain large amounts of low-grade disseminated chalcocite and chalcopyrite in porphyry. Miami Copper plans to have the new open-pit ready for production by the time the ore body at its other subsidiary, Castle Dome Copper Co., Inc., is exhausted. At mid-September, stripping operations at the pit site were well advanced.

To facilitate the mine's development, an agreement has been reached between Copper Cities Mining Co. and the Defense Materials Procurement Agency for an expansion program. Under the agreement, DMPA has agreed to buy, at 23 cents a pound, up to 170,000,000 lb of the first 192,500,000 lb of copper produced by the new facilities, provided the company cannot sell it to other purchasers in the United States at a higher price.

To Increase Production

Combined Metals Reduction Co. expects to expand operations in the Pioche, Nev., area in 1952, according to Otto Herres, president of the company. It plans to produce manganese, increase the present output of zinc and lead, and accelerate its development program. Construction of a plant at Pioche to concentrate oxidized ores and erection of an electrolytic refinery at Henderson, Nev., are included in the expansion.

To Increase Coal Output

The Morley and Valdez coal mines of the Colorado Fuel and Iron Corp. will temporarily operate six days a week. This new work schedule for the Las Animas County, Colo., mines will meet increased needs for coal at the Pueblo steel mills of the company.

Ship Rich Gold Ore

A recent shipment of high grade ore from the Wasatch Drain Tunnel, operated by the Zenda Gold Mining Co. gave smelter returns of $51 a ton. A 30-ton shipment of second grade ore brought $11 a ton. Zenda is preparing to ship on a larger scale in the immediate future. The property is located on a 700-acre lease in the Alta district, 26 miles from Salt Lake City, Utah. The 5500-ft tunnel is being extended to reach a number of well defined fissures which produced large quantities of high grade ore some years ago.

Clean Copper King Shaft

Work has been resumed in the Copper King shaft of the old Silver Crown mining area 22 miles west of Cheyenne, Wyo., by Harry Ferguson and Pat Dineen, Cheyenne. Timber, debris and water have been cleared to the 140-ft level and ladders installed. Nearly all ore in the shaft is said to contain commercial amounts of copper.

Reactivate Coal Mine

A new firm, the Bellingham Coal Mines Co., has been organized to reopen the Bellingham coal mine. Operations are scheduled to be resumed early this year. Located near Bellingham, Wash., the mine has about 2,000,000 tons of coal developed and another 2,000,000 tons in sight, it is reported.

Metals Milling Operating

The Metals Milling Co. of Tacoma, Wash., has begun operation of its new mill at Basin, Mont., and is accepting custom ore. The mill, placed in operation for testing purposes on September 27, is reputed to be one of the most modern small mills erected in the past 20 years. Beneficiation of complex lead-zinc ores is its primary objective. Other ores will be accepted, if in large enough quantities.

About seven men will be employed at the mill, which will operate on a six-day basis. Milling is currently at a 100-ton a day rate, but can be stepped up to rated capacity of 900 tons a week. Establishment of a mill in the Basin-Boulder district of Montana is expected to bring into operation many marginal properties now shut down.

Reopen Copper-Zinc Mine

Mining of copper ore has been resumed at the old Copper Hill property near Plymouth, Calif. The shaft has been dewatered, laterals cleaned out and repaired and a small crew is preparing the mine for operation. About 150 tons of copper-zinc ore were shipped recently to a Utah smelter. Arrangements have been made for development of areas beyond present workings. The property was drilled by the U. S. Bureau of Mines in 1943 to a depth of 800 ft, and located ore carrying good zinc-copper values north of the main workings.

Mining Claims Sold

International Lead and Iron Co. has sold a large block of mineral ground just across the United States border in British Columbia, to Edward Gerard Brown and Associates of Vancouver, B. C. The property consists of 18 mining claims located in a new zinc-lead field now under intensive development.

Exploring in Quartz Hill Area

Realty Co. of Denver, Colo. will explore for uranium ores on its Quartz Hill holdings near Central City, Colo., under a contract with Defense Materials Procurement Agency. Estimated cost of the work will be $80,000, of which the government will pay 90 percent. Realty holds fourteen claims on Quartz Hill, the mining site which produced the pitchblended ores used by the Curies in the experiments which led to the discovery of radium. Exploratory work may lead to discoveries of defense-vital ore deposits. Dewatering operations have already been started on the property.

Schedule Tungsten Exploration

Extensive exploration and development of tungsten ores in Ophir Canyon in Smoky Valley, Nev. is scheduled soon by Newmont Mining Co. An access road has been built to the property and operations will start as soon as mining machinery can be installed. Newmont is interested in developing sufficient tungsten ore to warrant revamping its gold mill at Goldfield, Nev. into a scheelite concentrating plant.

Develop Tungsten Mine

Double Eagle Tungsten Co. is preparing to mine tungsten in the Black Pine District near Philipsburg, Mont. after receiving a government loan for development. Five men are preparing to sink an incline on the vein. Ground has been cleared for the tunnel site, a road built to the property and machinery is being installed in preparation for actual mining operations. Tungsten ore of three percent or more tungsten content has been developed on other parts of the property and shipment will begin as soon as the government establishes a stockpile. Plans are being developed for a mill to produce a 55-60 percent hubernite concentrate, the grade now required by industry for immediate use.

Test Silver-Copper Vein

Coeur d'Alene Mines Corp. is now running a diamond drillhole to test the structure 100 ft below its southwest workings on the 2800-ft level at Osburn, Idaho. President H. C. Mowery says a 100-ft raise has been started on a narrow silver-copper vein on the 2800-ft level. Deeper test holes may follow, if results warrant.

Acquire Rare Earth Deposit

Molybdenum Corp. of America has announced the acquisition of a large tract of land, said to contain the world's largest deposits of rare earth minerals, in eastern California near the Nevada state line. Exploration and drilling has developed a large tonnage of good grade ore which can be strip mined according to Marz Hirsch, president of the firm.

Sheridan-Wyoming Expands

The Sheridan-Wyoming Coal Co., Inc., has purchased the Arrowhead Coal Co., Denver, Colo., and will continue to mine the Pinnacle Seam Moffat Coal from the Arrowhead mine located in the Oak Hill district of Routt County, Colo. An expansion program to increase production from the mine is planned.

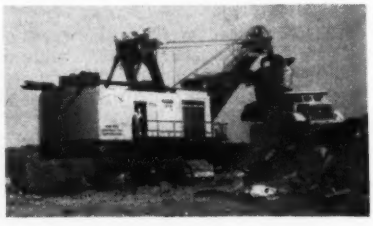
Also acquired by the new owners of Arrowhead was the Keystone mine of the Keystone Coal Co. Efforts are being made to increase production at Keystone.

Manufacturers Forum

Introduce Large Shovel

A new 10-cu-yd mining and quarry type machine described as the world's largest, most powerful shovel on two crawlers, is being announced by Marion Power Shovel Co. of Marion, Ohio.

It is the Marion 191-M for which many impressive performance features are claimed. One of the earliest uses of the 191-M will be as a working companion for new, large truck haulage



units in the 50-ton class. There has been a definite trend for several years toward larger trucks in several industries, and the Marion 191-M has capacity to load them in three or four passes.

Most interest in the new machine is expected to come from industries such as mining, quarrying, heavy construction and coal where the hardest, toughest materials must be excavated on a continuous, high-yardage schedule to meet demands for constantly growing production.

The 191-M is a bigger, more heavily built machine than action photographs suggest. Proportionately larger and stronger throughout than smaller shovels, and often teamed with some of the biggest haulage equipment in use today, its size and capacity do not impress a spectator until he sees the machine at close range. In the accompanying photographs, the 191-M is shown with a recently-developed Euclid truck of 50-ton capacity. The recent introduction of newer and bigger haulage units is one of the important factors that helped create a market for the new 191-M.

The shovel is basically a full electric machine with Ward-Leonard controls. It is equipped with "Amplidyne" or "Rototrol" high-speed electrical controls to permit operating speeds that would otherwise be impractical in such large, heavy assemblies. High voltage line current is converted into direct current for powering the operating motors. Separate motors and generators operate the hoist, crowd and swing motions, and there is an "exciter" for each generator combination to make the motors immediately responsive to the operator's controls.

For use in areas where electric power is not available, the 191-M will be furnished as an all diesel-electric machine, with diesel engines driving the d-c generators. The first of the 191-M machines is diesel-electric.

Increase Production

With over 40 percent more struck capacity than previous models, the new "Cat" No. 90 scraper is designed to increase earth-moving production when used with D8 tractor power.

Struck capacity of 21.2 cu yd can be increased to 25.5 cu yd with the addition of top extensions or sideboards.

Likewise, heaped capacity is 27 cu yd, or 31 cu yd with the available sideboards.

"Caterpillar" is building the No. 90 scraper at its new earth-moving equipment plant in Joliet, Ill. Shipping weight of the unit is 35,100 lb. Additional information can be supplied by "Caterpillar" dealers or by Caterpillar Tractor Co., Peoria, Ill.

Drill Dust Collector

Columbia Technical Corp. has placed on the market the Konigsborn Drilling Dust Exhauster, an apparatus to reduce the dust caused by percussion rock drilling. Operated with compressed air from any available system, the unit produces a vacuum which draws cuttings and dust from the bore hole. Storage tanks are used to hold the filtered material.

Manufactured in three models, the Konigsborn Exhauster is available through Columbia Technical Corp., 5 East 57th St., New York 22, N. Y.

Blasting Meter Announced

A new blasting meter—a combination voltmeter, ammeter, and blasting galvanometer for practical field use in the application of industrial explosives—has been announced by Hercules Powder Co. Explosives Department. The new instrument is called the V.A.O. (volts, amperes, ohms) blasting meter.

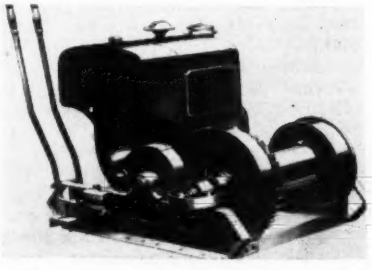
Important features are: it contains the necessary electrical components adjusted to specific ranges for checking stray currents and voltages around blasting operations; it is equipped with a rectifier and, therefore, can be used for detecting either alternating or direct current and voltages; and it can be used as a blasting galvanometer for checking the circuit of individual electric detonators or detonators connected in series.

A booklet describing the V.A.O. blasting meter and giving instructions regarding its use can be obtained from Hercules Powder Co.

Feature Hydraulic Control

A new series of hoists has been introduced by King Manufacturing Corp., 3146 W. Chicago Avenue, Chicago 22, Ill.

Hoisting control is obtained through the use of an oversize hydraulically operated clutch. External contracting three-in. band brakes are used to insure safe stopping power. Automatic safety ratchets used in conjunction



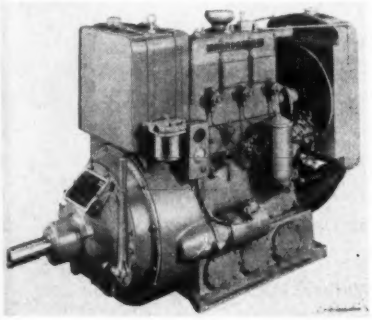
with the brakes are standard equipment on all models.

The hoists are ideal for dockside and warehouse loading and stacking, underground slushing and scraping operations, logging, pit and larry-car hauling, and other hoisting and haul-

ing operations. The same rugged construction inherent in all King hoists has been incorporated in the new hydraulic series. Literature sent on request. Ask for Bulletin No. 450.

New Diesel Engine Developed

Addition of a new, three-cylinder diesel engine, conservatively rated at 30 to 45 hp within a speed range of 1200 to 1800 rpm, is announced by Nordberg Manufacturing Co., Milwaukee 1, Wis. The new power unit supplements the Nordberg 4FS one- and two-cylinder, 10 to 30 hp diesel engines. They were developed to meet



the need for low-cost, compact, heavy-duty engines in the small horsepower field.

This new engine, known as the 4FS3, is now in production at Nordberg's Milwaukee plant. It has a 4½-in. bore and 5¼-in. stroke and is a four-cycle, vertical, mechanical injection diesel engine. Built as a complete, self-contained, ready to operate unit, it is available as an electric generator set, pumping unit and with clutch or stub shaft power take-off for direct connection or belt drive. This dependable power unit is also available with heat exchanger cooling for marine auxiliary applications.

Nordberg 4FS3 diesel engines with direct or clutch power drives are readily adaptable for replacement engines in hoists, small shovels, etc., and can also be used as a power unit for driving well-drilling machines, compressors, blowers, saw mills, oil-field pumps, etc.

Announce New Trailer

A new addition to the Phillips line of material-handling equipment is the Model T-SRF-½ Phil-Dump trailer. This self-dumping unit, with its ½-cu-yd capacity, was designed for three-way use—pulling by hand, lifting and transporting by fork lift truck, and towing singly or in train by industrial tractor.

Conveniently sized for handling by one man, this Phil-Dump features a sturdy tongue for manual and tractor handling. The design also includes pockets for accommodating the prongs of a fork lift truck. These provide stability while the trailer is being carried by or dumped from a lift truck. Made of heavy-gauge steel of all-welded construction, the Model T-SRF-½ has wheels equipped with roller bearings and solid rubber tires. For maneuverability, two of the wheels are castered.

Offer Reversible Gloves

Washington Glove Corp., 106 N. Water St., Milwaukee, Wis., glovemakers for 39 years, has recently introduced their new product . . . a reversible plastic-coated glove so constructed that it can be worn on either hand. Using the slogan "4 Gloves Wear in Every Pair" (because of the reversible feature), the makers have developed them for practically every type of industrial use. For glove users with a specific glove problem, Washington Glove Corp. has a testing laboratory to work out a satisfactory solution.

Fully Jumbo-cut, the gloves have a soft, fleecy lining for the ultimate in hand comfort. Strong yet pliable, because of the unusually superior impregnating plastics used, they are claimed to easily outwear leather or rubber gloves, customarily used for industrial work.

Available are the Knit Wrist, Short Gauntlet and Full Gauntlet models.

Tougher Crusher Parts

Hadfield manganese crusher cones and mantles, rebuilt and hard-surfaced using the Unionmelt welding process by Finning Tractor and Equipment Co., Ltd., of Vancouver, B. C., now outlast the original parts. Results are so successful that hard-facing is now also applied to new units to give them 50 percent more service life than unprocessed parts, according to the company. Inspection after service reveals little or no deterioration of the hard-faced surface.

New cones and mantles are surfaced by applying a special hard-facing underlay first, and then overlaying with hard-facing rod. For units that have been in service, a preliminary build-up of manganese-steel may be required prior to depositing the special hard-facing underlay. If the unit is worn more than ½ in., reclamation is not attempted.

The crusher part is first given a preheat from 150 to 200 deg F in accordance with standard practice, and during welding the temperature of the part is kept below 500 deg F at all times. Frequent checks with temperature-indicating crayons enable the operator to control this important factor. Prolonged heating in the neighborhood of 750 deg F would result in embrittling the Hadfield manganese steel.

—*Announcements*—

Robert H. Evans has been appointed executive assistant to the president and executive committee of **Olin Industries, Inc.**

Chelsea R. Phillips, long associated with iron ore handling and processing on the Iron Range, has been named field engineer at Hibbing, Minn., by Hewitt-Robins Incorporated. Phillips will set up and head the company's new office at Hibbing, according to Lester D. Bigelow, vice-president in charge of Hewitt-Robins' Central Sales Division, who announced the appointment.

Fred C. Foy, former manager of the sales department, **Koppers Co., Inc.** has been elected vice-president and general manager of the tar products division, succeeding **J. N. Forker**, retired. **Cooke Bausman, Jr.** has been named acting manager of the sales department.

CATALOGS AND BULLETINS

BELT BOOKLET. *E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.* Practical belt suggestions and engineering data are included in the 16-page booklet recently printed. The illustrated booklet contains information on making belts endless on pulleys, types of motor bases, fastness, lacings, cement, preservation and repairing belts. Belt formulae and a table on horsepower rating of shafting of various diameters at various speeds are included in the engineering data section. This booklet may be obtained, free, by writing the company.

DRILLING MUD CIRCULATION. *Great Lakes Carbon Corp., 5845 Atlantic Ave., Long Beach 5, Calif.* This is a new descriptive folder on Strata-Seal, a lightweight additive to combat and prevent lost circulation of drilling mud. It gives well histories demonstrating the success of the material.

SLURRY PUMP. *Oliver United Filters, Inc., of New York, Chicago and Oakland, Calif.* A new bulletin, No. 309-R describing the Oliver Diaphragm Slurry Pump known as the ODS Pump. Of particular interest to pump men will be the data on the No. 4 (4 in.) Pump which was recently brought out. Bulletins and other information on the ODS Pump may be obtained by writing or calling the nearest Oliver United office.

REPAIRING WITH MANGANAL. *Stulz-Sickles Co., 134 Lafayette, Newark 5, N. J.* A folder describing the repairing of worn buckets, crusher parts, tractor sprockets and pads, conveyor chain wear strips and other heavy equipment parts with Manganal, a special analysis of manganese-nickel steel, is available upon request from the company address above. Manganal is claimed to work harden to 550 Brinell and to have a tensile strength of approximately 150,000 psi.

Index to Advertisers

What's ahead for you?

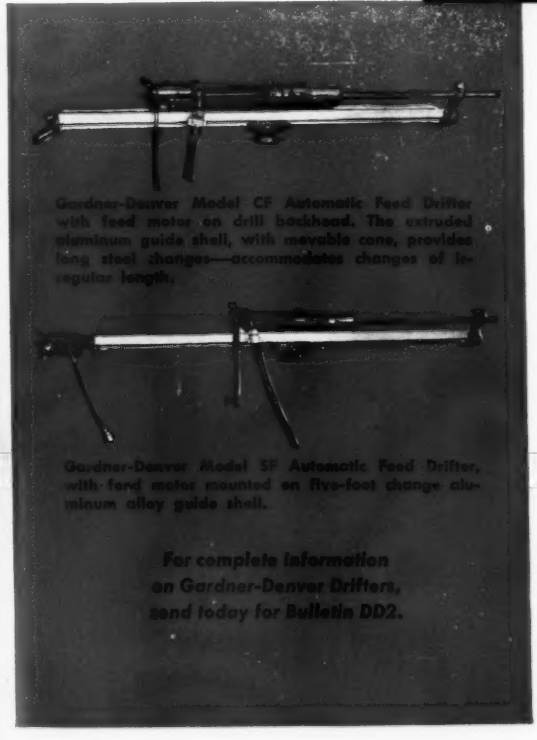
Increased demands for ore production from your mine?

A stepped-up development program to reach your ore reserves?

Hard rock you've got to "hole through" in a hurry?

A program to hold down production costs?

Gardner-Denver CF89H Automatic Feed Drifters.



Gardner-Denver Model CF Automatic Feed Drifter with feed motor on drill backhead. The extruded aluminum guide shell, with movable cone, provides long steel changes—accommodates changes of irregular length.

Gardner-Denver Model SF Automatic Feed Drifter, with feed motor mounted on five-foot change aluminum alloy guide shell.

For complete information on Gardner-Denver Drifters, send today for Bulletin DD2.

For help in solving mining problems such as these, choose famous Gardner-Denver Automatic Feed Drifters. They're designed by men who know what it takes to do a fast, low-cost drilling job underground.

The Gardner-Denver self-adjusting feed, for example, responds automatically to bit penetration — is automatically regulated by the type of ground being drilled. Maximum drilling speed is easily maintained—"green" miners drill almost as fast as "old-timers." The long-wearing, "slow-motion" piston feed motor is economical to operate, too—uses only 3% to 5% of the total air consumption of the drill.

SINCE 1859

GARDNER-DENVER

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